ELECTRICAL CONTRACTING

ENGINEERING • INSTALLATION • REPAIRING • MARKETING

November
1935

Why Contract Separation is Justified

Range Wiring at $27.00

Sealed Stator Windings

Conduit Color Coding

Selling Production Speed-up

The Inspector's Obligation

Simplified Filing

ANNOUNCING A NEW G-E TIME SWITCH

G-E Type T-17 time switch

More widely useful... low in first cost, installation, and maintenance. Profitable for contractors

TWO years of development have gone into the making of this new G-E time switch. Our engineers, working in conjunction with our General Engineering Laboratory, have produced a simpler and more widely useful switch.

It offers you greater opportunities for profit. Its increased capacity fits it to handle alone many jobs that formerly required, in addition, contactors. This saving increases your opportunity for installing controlled show-window, store, and sign lighting. In the new jobs that these switches open up, you profit on the switch itself, on the wiring, fixtures, and accessories.

You can get further details about this new time switch from the nearest office of the G-E Supply Corporation, the nearest G-E sales office, or direct from General Electric, Dept. **6B-201**, Schenectady, N. Y. Ask for a copy of Bulletin GEA-1427D.

FEATURES

Telechron motor timed and powered.

Double-pole switch, 80 amperes; triple-pole, 120 amperes—split load. Saves cost of contactors.

Convenient knockouts; connecting lugs furnished—installation is easy.

Heavy silver contacts—will last for years.

Six forms, for either clock or sun schedule.

Can be mounted in swinging signs—indoors or outdoors.

A similar switch, the T-27, for indoor use only, is available at a lower price.

440-65

GENERAL ELECTRIC

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ELECTRICAL CONTRACTING

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MARKETING

for

ELECTRICAL CONTRACTORS
INDUSTRIAL
COMMERCIAL
RESIDENTIAL

ELECTRICAL INSPECTORS
ENGINEERS
SERVICE SHOPS

and others engaged in the business of electrical construction

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DEPARTMENTS

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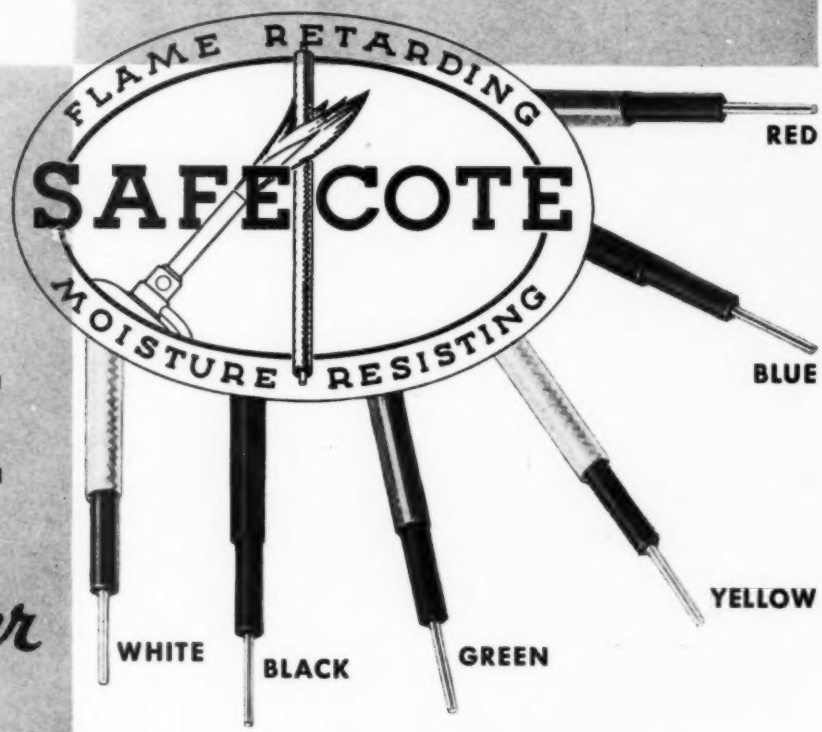
1,635,829	1,765,000	1,410,790
1,772,436	1,798,486	1,536,549

NO WIRE *can be better than its* INSULATION



Wire-life and satisfactory performance depend directly on insulation. And the quality of any insulation rests upon rubber. That is why "U.S." with its vast experience in all fields of rubber development can make better insulation. Why "U.S." Safecote provides the ultimate in wire performance. Made in all sizes, in a variety of colors.

Stocks in All Industrial Centers

1935 is the 25th anniversary of "U.S." Rubber plantations in the Far East. And the crude rubber production of "U.S." is now more than three times the combined output of all other American rubber companies combined. Controlled quality from the actual planting of the rubber tree, bud grafting, tapping and so on down through the various manufacturing operations to the finished product, assures extra value and extra performance for the user.

UNITED STATES RUBBER COMPANY — US — TRADE MARK

Wire Division

United States Rubber Products, Inc.
1790 Broadway, New York, N. Y.

United States Rubber Company

EC
NOVEMBER 1935

Installation

THE installation of wiring in a building is in a sense like a factory process in that labor and materials are combined to create a new product. On the other hand, wiring differs from factory work in that virtually every job is different—different not only in design but in all probability in materials and labor.

THE problem, therefore, is one of so combining the ingredients that the installation will perform as intended, and that a profit will result from the job. The subject of installation, therefore, is much broader than the mere placement of certain materials in a building. It involves labor management, material selection and job management, as well as technique.

THIS, in fact, is the most important phase of electrical contracting. Unless a contractor understands this part of his business, all the engineering and marketing knowledge will not prevent him from losing out. And for that reason, installation and all that it means must necessarily be the most important part of the editorial program of ELECTRICAL CONTRACTING.

WITHOUT a knowledge of labor management, the contractor would have no knowledge of labor costs and therefore would be unable to estimate. He must be a careful selector of materials because he alone must make the job work as specified. He therefore must have a knowledge of the performance of materials. He must be able to manage a job and coordinate all of its ramifications if he is to reduce waste and keep out of the red. And finally, he must be constantly improving his technique, alert for new and more efficient methods, in order to meet competition.

THE editorial program of ELECTRICAL CONTRACTING, therefore, includes consideration of labor management, cost studies and estimating, product analysis and performance, job management and field studies of methods, tools and practices, and an interpretation of the National Electrical Code. The program is laid out with the intention of serving the reader with live, practical and up-to-date information, to help him to do a better job more efficiently.

ELECTRICAL CONTRACTING

Vol. 35 NOVEMBER, 1935 No. 1

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S. B. Williams, Editor

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FIELD BRIEFS

● A GENERAL anti-bootlegging order was issued two years ago to all city employees by officials of Albany, N. Y., which is reported to have been very helpful to licensed contractors. A considerable amount of electrical work which had been done during spare time by engineers, maintenance men, firemen, and other city employees was affected by this order.

● IN DEDICATING the Whiteface memorial highway in the Adirondacks of New York state on September 14, President Roosevelt spoke from atop the 5,000-ft. mountain over a beam of light to the crowd at the Lake Placid airport, seven miles away. This was made possible through the installation of special apparatus by General Electric engineers.

● THE ANNUAL LOSS from fires on farms in Michigan, due to defective wiring, as reported by the farm mutual fire insurance companies only, amounts to nearly $100,000. Since so much of the cause of farm fires is listed as unknown, it is estimated the actual fire loss from defective wiring on Michigan farms is nearer a quarter of a million dollars annually.

● A FARM ELECTRIFICATION survey of the entire State of Massachusetts disclosed an average estimated farm building wiring cost for 5,474 potential customers of $134, and this probably includes lighting fixtures. The cost to make the survey alone averaged $60 per mile for the projected 1,168 miles of extension. Line cost was estimated to average almost $1,750 per mile, with nearly five customers to the mile. The initial appliance outlay was estimated at $112 per potential customer.

● LACK OF LUBRICATION resulting in burnt out bearings causes 65 per cent of all fractional horsepower motor repair jobs, according to the shop records of Wm. Weirich of the Electric Refrigerator Motor Co., Philadelphia, Pa.

● SERVICES MUCH LARGER than anything so far suggested are apparently a thing of the near future for residences. The Electric Service League of Toronto reports, for instance, that it has run into a number of cases where 140-amp. services have been insufficient to provide for the addition of a water heater with a 30-amp. booster.

● A SURVEY of range wiring costs and practices is being undertaken by N.E.M.A. Preliminary figures show wide variations indicating the possibilities for standardization and simplification.

● TWICE AS MUCH LIGHT, and three to four times the visibility are provided in the lighting of a mile-and-a-quarter test stretch of highway near Cleveland, which was opened on October 21. It is estimated that if applied to our most dangerous 50,000 miles of highway, it would save annually 5,000 lives, and 50,000 injuries.

The *Answers* to the 5 arguments against *Contract Separation*

By John W. Hooley

Representative of N. E. C. A. on and Chairman of Joint Committee on Separation of Contracts

FOR the past twenty years the electrical contractors, master plumbers and heating, piping and ventilating contractors, have been striving through their Associations to secure through state and national legislation the separation of electrical and mechanical trades from the general contract. During this time the arguments most seriously put forth against separation of contracts have been five in number. These arguments and our answers are as follows:

1. *That with separate contracts work may be delayed because of loss of coordinating influence of the general contractor.*

The states of New Jersey, New York, North Carolina and Pennsylvania, with ample experience over many years in building under separate contracts projects of all sizes, have not found by their experience that work is delayed because of lack of the coordinating influence of the general contractor, and are still awarding separate contracts for the electrical, heating and ventilating, and plumbing equipment of buildings constructed by the state as well as the counties and municipalities in these states.

Many cities throughout the country follow this system in the construction of their public buildings. One example is Detroit, Mich., in which the school board gave a thorough trial to awarding contracts for these three mechanical trades separately, then to awarding them as part of the general contract, and finally has reverted to the former system of awarding these contracts separately.

The Federal Government has had experience with this system. The Bureau of Yards and Docks of the Navy Department, and the Veterans Bureau are still using the system of awarding separate contracts on large projects because of the savings they are able to make to the government.

2. *That the expense to the government will be increased because of extra inspection, correspondence, etc.*

Even when the government is doing work through the general contractor method, the government inspectors contact directly with the representatives either of the electrical, heating or plumbing contractors. Certainly no additional expense would be incurred for the already superlative inspection the government maintains and which, through their rigid inspection service, enables the government to obtain from irresponsible contractors work in accordance with the plans and specifications under the present system. We believe that, by letting the contracts separately, if anything there will be a decrease in the cost of inspection because the class of mechanical contractors that will bid direct to the Government will be such as to lessen reinspection, correspondence, etc. At present, in the event that any official communication is forwarded to the general contractor regarding any of these three trades, the general contractor must take up with and depend upon the representatives of the electrical, plumbing and heating trades for the information necessary to handle the communication. Under the system of separate contracts there ought to be considerable saving of expense to the government by direct contact with the three trades plus a saving of time (which is money in these days), and a speeding up of efficiency.

3. *That labor difficulties might arise due to possibility of having "union" and "open shop" contractors on the same project.*

In many cities open shop men and union men work side by side without difficulty or misunderstanding; for example, Philadelphia and Detroit. The principal cause of open and closed shop labor disputes has been the very low wage rate upon which some contractors have based their bids, but because of the passage by the Congress of the United States of a bill requiring the prevailing wage in each locality to be paid on all government work, and the rigid enforcement of this law by the executive department this cause of labor dispute has been eliminated.

4. *That it would not eliminate shopping of bids.*

Separation of contracts would practically eliminate shopping of bids, because it would then be within the power of any of the departments receiving bids to draw their specifications covering materials in such a manner that the contractor would have to state the class of material he was bidding upon. This method is now practiced by the Bureau of Yards and Docks, where a contractor wishing to give the government a superior class of material to that which was specified would be permitted to do so or would be required to reimburse the government for the difference in any resulting savings.

5. *That the bill would be unfair to the small contractor who is just beginning business.*

The small contractor would compete for work of a size which he is organized to handle and would deal direct with his government without the intervention of a third party. It would encourage the small contractor because the larger contractors would be more inclined to bid for the larger work and would leave the small field open for the local men who without traveling expense, etc., would be well equipped to successfully compete and serve the government both economically and efficiently on this class of work.

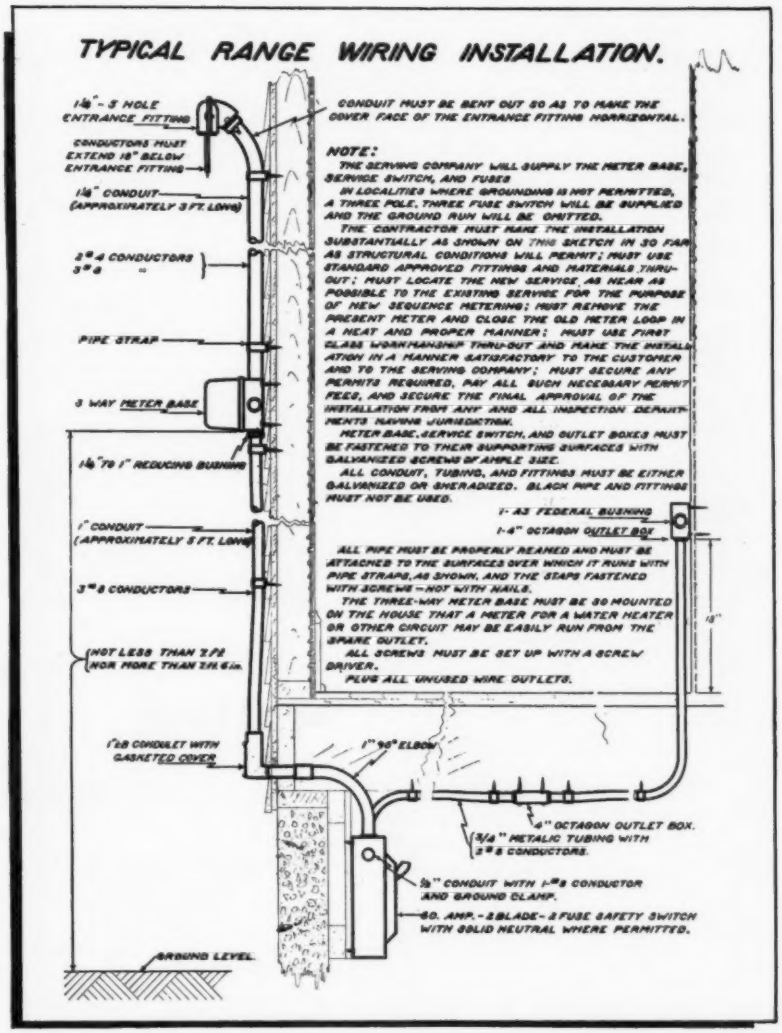
How a $27.00 Range Wiring Price Worked

by Henry W. Young

AT a flat price of $27.00 per installation, could the contractors of Portland, Ore., figure any profit out of the free range wiring campaign? That was the problem put up to them by the two utilities, the latter agreeing to furnish the meter base, switch box, switch, fuses and the 1¼-in. to 1-in. reducing bushing at the meter base. This represents $4.00 of the $27.000 in material, which the utility furnished. The two diagrams show the standard hook-up that was adopted.

The free wiring campaign started on March 18 and was to close May 25, the quota being set at 1,500 ranges to be sold and wired. After one or two extensions of time, the free wiring has now apparently settled down to the point of going on indefinitely, and the total sales late in August had reached upwards of 3,000.

At preliminary meetings between the contractors and utilities, the former felt that a flat rate of at least $31.00 would be necessary to enable them to make a profit. But it was the utilities who were "giving the party" and after an exhaustive analysis of the situation they set upon $23.00 cash over and above the materials furnished as the utmost amount that they could pay.



MATERIALS REQUIRED FOR THE AVERAGE JOB

2—½-in. steel tube connectors
4—¾-in. steel tube connectors
1—1¼-in. electrolet
10—Pipe straps
2—Two 54C1 covers
1—Groundlet
1—1-in. ground bushing
1—LB37 condulet
7 ft.—½-in. steel tube
16 ft.—¾-in. steel tube
5 ft.—1-in. conduit
4 ft.—1¼-in. conduit
1—Factory elbow
1—¾-in. steel tube coupling
1—1-in. close nipple
1—1-in. conduit coupling
12 ft.—No. 4 wire
85 ft.—No. 8 wire
2—54171 boxes
1—1-in. by 3-in. nipple

The result was that in the beginning a majority of the contractors felt that there was nothing in it and did not attempt to participate. The early weeks of the campaign showed that the bulk of the wiring was being done by not to exceed six of the contractors, who were going after the work energetically. As time went on, however, more sought the work and it was more widely distributed.

The policy of the Portland General Electric Company was to select a group of contractors who were well established in business and who indicated a desire to participate and pass the work out to them, to be followed later by a second group, and so on. The other utility, the Northwestern Electric Company, on the

JOB COSTS	
Average cost of materials per job, exclusive of materials furnished by utility	$10.36
Labor (5 man-hours per job at $1.25 per hr.)	6.25
*Cost of permit	1.50
	$18.11

*Outside of the city limits, where no permit is required, the flat rate is not reduced by the amount of the permit fee and the contractor is allowed to keep the $1.50 as recompense for the greater distance from shop to job.

ADDITIONAL OVERHEAD TIME FACTORS INVOLVED (Estimated average)	
Job supervision	1 hr.
Shop time	½ hr.
Office	½ hr.

	Average Man-hours per job	Labor at $1.25 per hr.	Average Supervision Time	Average Shop Time	Average Office Time	Average Cost of Materials	Over-time
Contractor No. 1	5 hrs.	$6.25	1 hr.	½ hr.	¾ hr.	$8.20	None
Contractor No. 2	4½ hrs.	5.62	1 hr.	1 hr.	Negligible	12.50	None
Contractor No. 3	4 hrs.	5.00	½ hr.	Largely done on truck rig and incl. under "labor"	½ hr.	10.00	Very little

other hand, elected to play the field from the start.

The main point of interest is to ascertain how the whole thing worked out for the contractors, or rather how they worked it out to meet the flat price. It was found impracticable to secure cost figures from a large number of the participating contractors and seek to average them. Instead, the materials and cost figures of one contractor who had gone into the work in earnest have been secured, and against his figures checks have been made on the most important items among three other typical contractors.

This study is based on the records of the Ace Electric Company, secured through the courtesy of R. H. Taylor, manager. This company is one of the leaders in the number of ranges installed thus far in the campaign. Accurate records have been kept from which the averages as to materials and labor costs per installation have been deduced.

The ranges were delivered, uncrated and set up by the dealer. The utility calls the contractor and arranges the time at which the installation is to be made. Since practically all are rush jobs, little lost time has been experienced on that score. The work is there to be done as soon as the contractor can get on the job.

In the case of the Ace Electric Company, overtime is not paid. If the job cannot be finished at the end of the day, the wireman goes back the next morning.

Previous to the campaign, the above contractor had done considerable range and hot water heater wiring—had rather specialized in it. Being familiar with the work, the regular crew has been employed, with additional men from time to time as the work pressed. With experienced men on the job for the most part, there were no particular methods evolved to save time as they already had the routine resolved to the simplest methods. However, the large number of jobs could not help but result in economies.

In general, the chief advantages to the contractor who desired to go after this work were (1) no sales cost beyond that of once contacting the utilities and demonstrating to them that facilities and knowledge of the business were sufficient to insure good work; (2) no collection cost; (3) no bad accounts to figure on. The money was waiting for them at any time after the installation was inspected and approved.

A check against the above figures was made with three contractors of different types who had done a large amount of the range wiring in this campaign. One was a downtown contractor operating an electrical appliance store. Another was a contractor who ordinarily figures on large work and operates from a downtown office building. The remaining one was a contractor in an outlying district. The time and cost figures are shown above.

In the survey made, it was the consensus of the progressive contractors that the free range wiring campaign has increased their total volume of business materially, and that the successful type of operator should be able to enjoy a reasonable profit from it.

Sealed Stator Windings

Stators are rewound to exclude oil and moisture and to eliminate lint gathering crevices

STATOR winding methods as employed by the Electrical Installation Company of Cambridge, Mass., an independently owned motor service shop, involve several departures from conventional insulation practice. Coils are not taped, special kraft paper is used for the slot cells instead of fish paper, and the coil overhangs are completely sealed with hand-molded plastic compound to exclude oil, moisture and imbedding foreign substances.

Because the sharp ends of coil slots are considered a critical breakdown point for stator coil insulation, despite extreme care during installation, this company has been using a long fibre especially treated kraft paper for slot lining. This paper is said to be sufficiently tough and pliable to withstand the shearing or puncturing stresses which occur at the critical points of pressure during coil installation. High dielectric values are likewise claimed for this material.

Since a plastic insulating compound is used, the coils are made up of cotton covered enameled wire, but without tape. Thus the coil mass is considerably lessened. These smaller coils are therefore more easily installed in the stator slots, are sub-

jected to less pinching, and require practically no hammering into position. When in place, the slot cells are easily wedged and offer a high varnish impregnation flow. A high grade of oiled linen is used for insulation between the overhanging coils. Practical tests in the shop have shown that this material has greater strength, and retains a maximum inherent dielectric value under stretching or displacement stresses when bias-cut rolls are used. Single thicknesses of oiled linen are used between each coil, and two thicknesses between phase coils.

The re-wound stator is preheated to 235 deg. F. to completely dehydrate the windings. It is twice submerged while hot in insulating varnish, and baked for two to three hours after each impregnation. A special compound is then forced by air gun between the coils and into the slots, to fill up all small cracks and crevices. A final coating of heavier compound is then molded on the windings by hand. A smooth surface is formed by skillful plastic workers, which, after being given a final lacquer spray forms a hard and smooth finished surface. This surface is claimed to exclude practically all oil and moisture. Lint and other foreign substances do not easily adhere to it. This smooth surface can easily be cleaned from time to time by rubbing with waste.

Some fifteen or twenty motors that were rewound and insulated under these methods by this company over ten years ago for a cotton spinning plant are claimed to be almost as clean as when delivered to them. There was no evidence of compound cracks, while megohmmeter tests showed high insulation resistances. A 40 hp. motor which had been similarly rewound in 1925 for a chemical dye works recently came in for repairs. It had been operated under extremely severe atmospheric conditions during this time, and was found to have failed only because of a broken spider. Although this latter concern became a customer of the Electrical Installation Company in 1921, and has grown from 300 motors to 1,400 motors since then, only about five motor winding failures occur per year. This low amount of motor outage is attributed to a steady program of rewinding all burnouts by the above method until the more severe drives in the factory are nearly all now so protected.

Because of the successful performances achieved from this winding practice, the Electrical Installation Company identifies its work by the use of bright orange lacquer for the final sprayed coating which covers the molded compound. This makes a pleasing appearance and also aids in the regular cleaning operations by plant maintenance crews.

1

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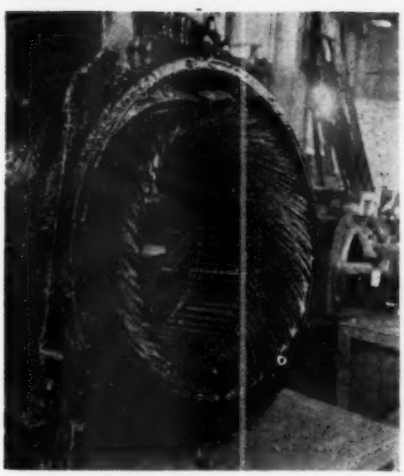


3

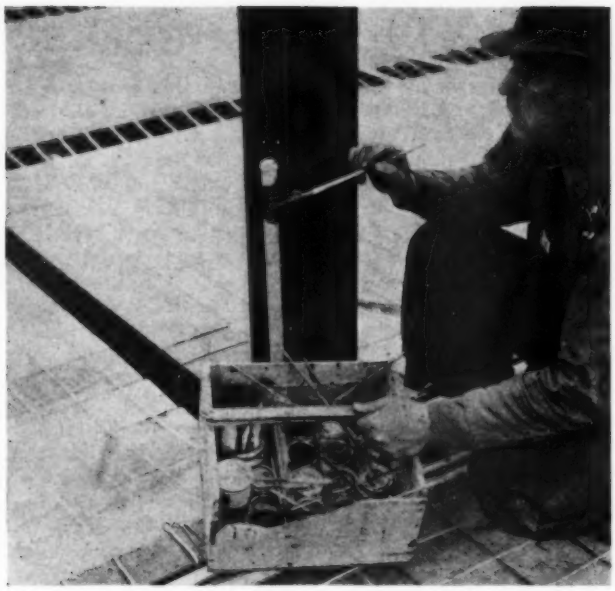
4

No. 1. A re-wound stator ready to be preheated for the first varnish dip. Note the absence of tape upon the coils. Bias-cut oiled linen is used, one sheet between coils and two between phases. Small coil mass and lessened overhang is apparent.

No. 2. After two dippings and three-hour bakings the stator is ready to be given a coating of compound filler between all cracks and crevices.

No. 3. A final coating is applied by hand which becomes hard and offers few crevices for gathering foreign matter.

No. 4. The completed job consists of a molded protective covering over the stator windings, over which has been sprayed a bright orange - colored lacquer. A gray-enameled frame and glossy-black rotor completes the job.



A daub of dark red enamel on this conduit identifies it as a fire alarm gong circuit conduit until the partition has concealed it from view. The wooden "tote" box or tray contains fourteen small cans of colored enamel, each assigned to a specific conduit system.

Color-Coded Conduits

Simplify Rough-in Work

THE marking of various conduits in colors for identifying fourteen systems of wiring was recently adopted by the Whiffen Electric Company of White Plains, N. Y., in wiring the Westchester County Home for the Aged and Infirm. This project, which spreads over four acres of ground, and comprises a floor area of over 350,000 sq.ft., presented a problem for the electrical contractor. Fourteen electrical systems required separate concealed conduit raceways throughout the various sections of the building. All of these conduits had to be installed in a coordinated manner as the floor construction progressed at various places about the job.

After a color was chosen for each of the fourteen systems, this code was noted upon the electrical drawings and a stock of small cans of inexpensive household enamel was purchased to correspond. The selection of color was as follows:

1. Fire Alarm Gongs—Dark Red
2. Fire Alarm Stations — Light Red
3. Lighting Circuits—Orange
4. Power Circuits—Brown
5. Bells—Light Green
6. Watchman System—Yellow
7. Inter - Comm. Phones — Dark Blue
8. Public Telephones—Light Blue
9. Nurses' Call—White
10. Radio—Gray
11. Return Call—Dark Green
12. Clocks—Oak
13. Exits—Pink
14. Sprinkler—Black

One of the first advantages to be derived from this method was discovered in picking up roughed-in conduits as certain poured areas were added to. Because of frequent shifts in pouring activities, to suit steel erection progress, there were many areas in which conduits had to be stubbed through slab cut-offs until further floor forms were provided. By daubing the ends of all conduits which projected beyond the pouring area with identifying enamel, they could later be extended across the forms without the need for spending extra time to re-identify them. Where two or more conduits of different systems were stubbed up or down near each other they too were coded.

The final advantage of color-coded conduits was realized in the nippling-out of conduit to various outlets. Because the outlets for each system employed a specific height and type of outlet box, this color identification eliminated the possibility of errors such as stubbing a clock conduit down to wall switch height. Much time was saved by this marking method, since it reduced the necessity of referring to the electrical drawings to scale off various conduits. The many bays which occurred in long corridors could be disregarded, in checking the positions of conduits for system identity.

A light wooden tray or "tote" box was provided for carrying the fourteen small cans of enamel, each with its small stencil brush. When the conduit work for a certain floor area had been made secure to the form, it was finally daubed or identified at the end of each run under the supervision of the superintendent. Any stubs which he considered likely to be confusing later on were similarly marked. After a last final checking with the electrical drawings, and with the system color code appearing thereon, the identified conduit system was ready for concealment.

A typical poured floor area in which the adjoining spaces may not be poured for several weeks. Various conduit runs were projected outward for later continuation.

How to Sell Production Speedup

THE September issue of ELECTRICAL CONTRACTING inaugurated a series of sales-analysis charts for creative selling of industrial electrical contracting services and equipment. On this page is the first of a series of charts subsidiary to the main chart that appeared in September. This one takes up in more detail the opportunities in selling the idea of *speeding up production.*

Speeding up production will, of course, be a problem of increasing importance in all plants as business picks up. In most cases—at least in the immediate future — the pressing need will be to increase output without making too extensive capital expenditures. This need for economical expansion will be a good opportunity for the industrial electrical contractor to point out how his services can step up production with existing facilities at comparatively low cost.

Study of the breakdown shown in the chart will immediately bring many kinds of equipment which the services indicated will help sell. The accompanying table lists the main equipment items.

EQUIPMENT WHICH CAN BE SOLD ON THE BASIS OF SPEEDING UP PRODUCTION
Circuit Breakers
Explosion-Proof Equipment
Lamps and Lighting Equipment
Mechanical Power Transmission
Motors and Control—individual drives in place of group drive; variable-speed motors; gearmotors and special motors
Pushbutton Stations—remote control
Signaling Equipment—amplifiers; interplant telephone equipment; call system
Switches—limit switches or photo-tube controlled circuits for conveyor control

SALES ANALYSIS CHART *to sell* "Speeding up Production"

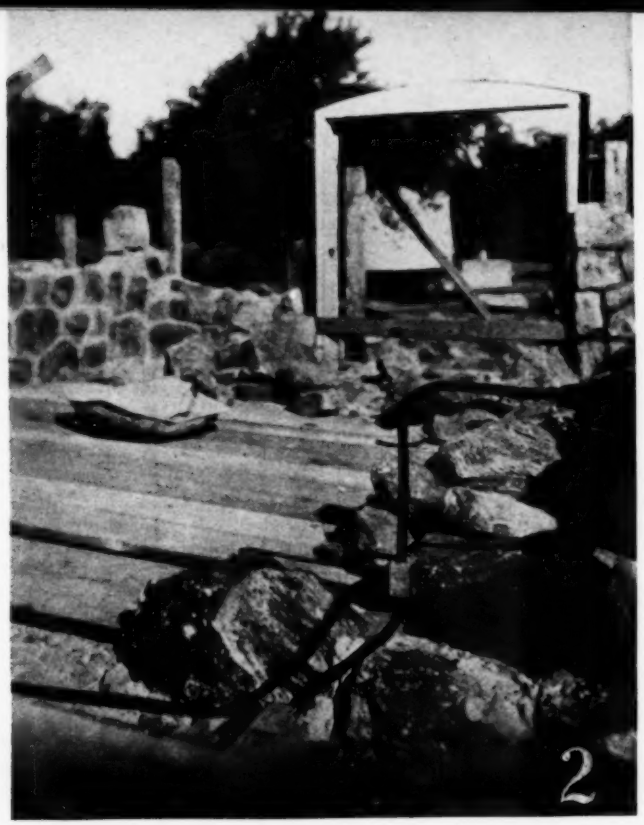
	PLANT OBJECTIVES	TYPES OF INDUSTRIAL CONTRACTING SERVICES WHICH CAN BE SOLD TO HELP ATTAIN THESE OBJECTIVES
1	Elimination of "bottle necks" in production	Suggestions on limit-switch or phototube conveyor control to avoid piling up of parts or products
		Relayout of equipment to improve handling and flow of work through the plant
2	Elimination of unnecessary movements of parts and products from one department to another	Suggestions on signalling and communication systems to facilitate routing of work
		Making some pieces of equipment portable (with integrally mounted motors, long, flexible plug-in cords) so that where feasible they can be moved to the work instead of the work to the equipment; installation of busway wiring for flexible electrical distribution
3	Increasing machine outputs	Tests with recording instruments to help schedule the best equipment use
		Check-ups on motor applications and controls to get maximum machine speeds and wide speed ranges where necessary
		Change-over from group to individual drive to make operations of machines independent of each other
4	Insurance against interruptions in operations	Check-ups on drives to eliminate undermotoring
		Modern circuit protection to avoid outages on temporary overloads; explosion-proof wiring for hazardous locations
		Inspection of wiring for overloaded circuits and defective conditions
5	Maximum results for operators from existing equipment	Pushbutton starting and stopping of equipment, and check-up on applications of safety devices
		Control applications which permit one operator to run several machines where cycles of machine operations permit
6	Maximum speeds in assembly and inspection	Illumination foot-candle measurements in all departments to insure seeing conditions for maximum efficiency
		Application of meters, phototube devices, and the like to eliminate guesswork wherever possible

Variables in Large Residence Roughing-In Methods

LARGE residences impose an unusually severe test upon the practical judgment of estimators. Viewed from the architectural drawings as being comparatively simple to wire, the unknown factors which can affect labor unfavorably must be reckoned with in making reasonably accurate allowances for labor.

A large country home, situated in Westchester County, N. Y., that is being wired by Miller-Brown, Inc., of New York is a case in point. Employing fireproof construction, with outer walls of granite boulders, wall-bearing concrete floors, and cinder block interior partitions, this job entails all the elements of protracted, piece-meal rough-in procedure which can easily upset the labor estimate of an over-zealous bidder. In addition to this slow construction progress, such homes are usually isolated from other operations and thus offer no nearby fill-in work for taking up non-productive periods. Short sections of concealed runs must be installed almost daily in coordination with masons to assure exact positioning of outlets, and to prevent the disturbance of advance runs.

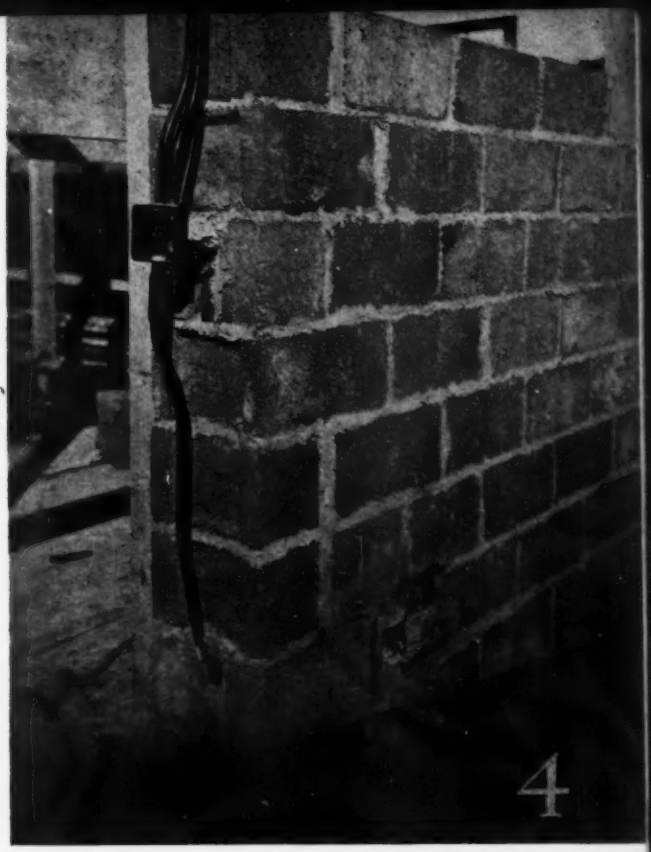
Some of the conditions which are common to work of this type are illustrated and described in the accompanying views.



No. 1. Rustic interior stone walls require the presence of the electrician as long as these walls contain outlets. Heavy stones are hard on small conduits and make their advance positioning difficult.

No. 2. Large stones make interesting rustic wall effects for a country breakfast room; however, they require painstaking freak bends in the conduits which loop to various wall outlet boxes. Because the choice of stones comes first, the outlets must be placed to meet them at a most convenient course. As a result several hours may be devoted to connecting one outlet on two or three conduits.

No. 3. Mantle brackets must be spotted at exact heights, and also spaced to align with interior trim. Masons must be checked at the



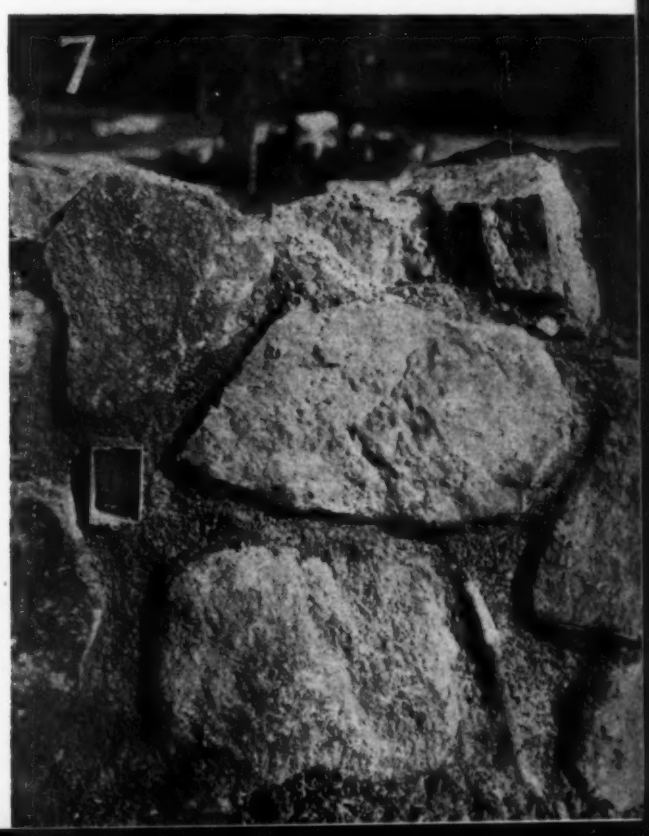
right time to allow for a course or joint at these exact outlet box positions. Not much can be done in advance except to make up the several pieces for walling-in.

No. 4. Here a 2-gang switch at the cased entrance to the library must meet the future wood trim, while two conduit stubs are directed up toward future ceiling outlets. A conduit feeds out of the concrete floor, and a supporting conduit running out of the back of outlet box into the cinder-block partition connects to a convenience outlet. Such jobs must be found as fill in jobs between pouring the several floor slabs.

No. 5. On a day away from the job this cinder-block wall went up minus the vertical conduit leading from a switch outlet to the ceiling. A 10-ft. length was finally shoved down from the top of the wall after the hollow tile space was chipped to align with the center box knockout.

No. 6. Interior trim and variations of floor levels introduce problems for the conduit installer. Here one of the library cases is to be wired from a conduit stubbed out along the floor. Flexible steel conduit will be connected on later, and routed to the first case outlet.

No. 7. Additional or changed outlets come high when their conduits must be run in stone work. This floor-fed switch box also has a side-connected conduit which may be seen running downward to an outlet at the right, after several grape-vine bends were made to get to the level floor.



The Inspector's Obligation*

by S. B. Williams
Editor, ELECTRICAL CONTRACTING

THIS paper is presented for the purpose of encouraging the electrical inspector to graduate from a "Don't" man, to the more enviable position of a "Do" man. A "Don't" man is one who is preventive, while a "Do" man is one who is constructive. It is a well-known fact that in any walk of life the man of constructive influence occupies a higher position and is more respected than one whose influence is solely preventive.

This appeal therefore, is from the standpoint of your obligations to the electrical industry, not from any sense of loyalty, but entirely from the viewpoint of your own best self-interest. This is not a narrow viewpoint, but rather an intensely practical one, because probably nine successes out of every ten are based upon a true appreciation of one's self-interest.

Until the International Association of Electrical Inspectors was organized, you had no place in the electrical industry, except as a few individuals made places for themselves. Your group was not recognized as a part of the industry. Now, through your association you are beginning to become articulate as a group, and the rest of the electrical industry is beginning to appreciate the possibilities for constructive influence that lies within your group. As a result the electrical industry is looking to you to do certain things, because of your public contacts, and the fact that you are neither a buyer nor a seller of merchandise, and are therefore in an unbiased position. Will you accept that responsibility and make for yourselves a place in the higher councils of the electrical industry, or will you be content to remain as mere policemen? My investigations lead me to believe that you are eager to go forward and become a strong factor in the electrical industry, but that the way is not altogether clear, and there are certain inhibitions and fears.

Your greatest opportunity, of course, comes through promoting the welfare of the electrical industry, while perhaps your greatest fear comes in the thought that your work might become commercial, and you might then lose your fine sense of public welfare. There is no question but what an irreparable damage would be done if you were to lose your sense of public welfare. In fact, your very strength lies in that attitude. It is, therefore, essential to find the things that are of benefit to the electrical industry, and at the same time are in the public interest.

On the other hand, a narrow viewpoint with respect to the commercialization of inspection is unsound. A great many inspectors have objected to promoting reinspection on the grounds that the purpose thereof was to provide work for electrical contractors. Today, of course, there

DON'T BE JUST A *Don't* MAN

is no stigma attached to anything that provides work for people, but in theory there can be no wrong to reinspection, even were it to create ten times as much work, providing the resultant safety and better installation is advantageous to the public.

Your jobs depend for their importance upon the growth of the electrical industry, and upon the extent to which you make your work important to your public. From your own selfish viewpoint, therefore, is it not advisable for you first to do all that you can properly to promote the electrical industry, and second to do all that you can to make your office of prime importance to your public?

Disconnected as you are from any manufacturer, wholesaler, utility, contractor or dealer, you are in a position to enjoy public confidence in your suggestions and ideas. You can take to the public the promotional ideas of the electrical industry, such as adequate wiring, reinspection, Better Light-Better Sight, electric cooking, etc. You can act as the spokesman for the electrical industry on new developments that seem to you to be of real merit, such as outdoor metering, photronic devices, explosion-proof wiring materials, new appliances, burglar and hold-up protective lighting. You are the only ones that can wage war on wiring bootlegging, and so direct people to the legitimate contractors. You are the only ones who can discourage the use of non-approved, sub-standard materials and devices, and in so doing protect and increase the position of the legitimate manufacturers. Except for the few electrical leagues there are in the country, you are almost the only unbiased source of information for people who are building their own homes, or constructing other buildings. If the public could be encouraged to come to you before the wiring started, you would undoubtedly suggest improvements in the wiring layout which would greatly improve the adequacy of the job.

Is such commercialism unethical? Is there any one of you who has not done something similar sometime or other? Is there any doubt in your minds that any of these activities would be very much to the advantage of the electrical industry, and would very greatly increase the importance of your office?

These are obligations you owe to the electrical industry and to yourselves.

You owe the public better safety and you have by no means done your job when you stop with the inspection of new premises. If you are operating under an ordinance, you

*Presented before the annual convention of the Eastern Section, I.A.E.I., Boston, Mass., Oct. 8, 1935.

must make the public understand that the ordinance is there for the public good, and so receive the public respect for it. There is no force in the home with such potential hazard as electricity. It can start fires and it can kill. Properly installed and properly used, it is as safe as anything else in the home. The public does not have to be scared, but the public should be made to appreciate the hazards, and so protect itself. In many cities there are now automobile safety programs, designed not to keep people out of automobiles, but to make the use thereof safer. The practice of public brake reinspection is being cheerfully and gratefully accepted by the public, provided, of course, it is being done honestly and without taint of a racket.

You owe it to your public to provide the same appreciation of electrical safety and the same kind of reinspection service. I am sure there is no question in your minds but what such activities would be instrumental in reducing the loss of life and the loss from fires from electrical causes. Is this work any less important or ethical because it will also result in more work for electrical contractors, and material sales for wholesalers and manufacturers?

The program of your association on public safety promotion is so important to you that every member of this association should take the initiative to make this program effective in his community.

You have the responsibility, not so much to place violations upon wiring, as to make sure that there will be no violations when the wiring is installed. And that means education

of those in the industry who make the installations. You have the opportunity to make suggestions to manufacturers regarding improvements or changes in design. Some inspectors are doing this, and those that take that attitude have found a greater desire on the part of the manufacturers to cooperate.

These suggestions mean much more work for the inspector. Many of you will wonder how you can do this and still keep up your inspections. By engaging in these activities, and thereby making your work more important, you make it easier to build up a staff, and as the head of a staff can make a better salary than you can make as a one-man inspection department. Moreover, you will find the support of the electrical industry to help you in getting this needed assistance, if you want to undertake to fulfill your obligations to the electrical industry. You will find also as you engage in this public education in closer contact with your fellow citizens, that you will have the public support when you go before your municipalities with a request for an additional appropriation.

There is an opportunity in the profession of electrical inspection for the man who can see in it the constructive rather than the preventive side, for the man who will recognize his obligations to the electrical industry as before enumerated, and who will realize that it is an obligation to himself and his family—an opportunity that will net in direct proportion to the manner in which he contributes of his time and energy to ethically advancing the electrical industry.

Safety Switches For Hazardous Locations

by R. A. Millermaster

Development Engineer, Cutler-Hammer, Inc., Milwaukee, Wis.

A STEADILY mounting list of severe losses in life and property resulting from explosions in hazardous locations in conjunction with the use of electrical devices and expansion of production facilities for alcoholic liquors has nationally directed attention towards electrical apparatus which may safely be used in such locations. While this interest has been directed toward all types of electrical devices, this article is concerned primarily with safety switches for hazardous locations.

Under requirements for these locations, especially where inflammable gases or dust are present, the National Electrical Code reads that "Fuses shall not be installed unless mounted within explosion proof enclosures. The fuse cut out bases and their enclosures shall be approved as unit devices for use in explosive atmospheres."

The fuse for the branch circuit involved can be more economically installed if combined with the disconnect switch. An alternate method, of course, allows the placing of fuses outside of the hazardous location along with the controller, and with remote control installations this presents no particular problem. In case of across-the-line starting, however, the controllers can most economically be placed in hazardous locations along with the disconnect switch and its fuses.

At the present time there is no question that safety switches can be placed in an enclosure properly designed to meet the requirements of hazardous locations containing inflammable gas or dust. With fuses combined with switches in these enclosures, some question has been raised regarding the additional hazard of the fuse. It was thought that

pressure released by failure of faulty fuse cases might produce a pressure surge that would, as a mathematical possibility, combine with an explosion in the enclosure to result in combined pressures hazardous to the mechananical strength of the enclosure itself. It is likely that exaggerated importance has been given this point. The possibility of combining of pressures is remote, involving, as it does, simultaneous occurrence of these two phenomena.

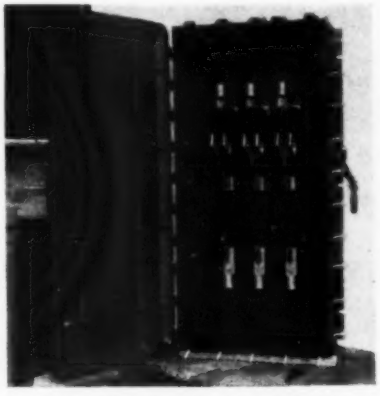
Suggestions have also been made that safety switches for use in hazardous locations be provided with interlocking means which would prevent the operation of the device if the cover were in the "open" position. The design of all apparatus described in the following paragraphs is dependent on maintaining very close fits of all parts going into making up the switch enclosure. Nothing but a very complicated and intricate interlock would prevent the operation of the switch where the cover holding bolts were not drawn up tightly. The covers of these enclosures might give every appearance of being closed and yet if a .015 in. gap existed, where a .003 in. gap was the maximum which could be allowed with safety, the piece of apparatus would present just as much of a hazard as though the cover were completely open. It does not appear to be feasible to apply interlocking means which would function in the range of cover looseness indicated. In addition, other hazards such as the correct installation of conduits, the guarantee that no one will operate devices with the cover removed, etc., are such that it seems more practicable to stress the intelligent use of this type of apparatus in the location involved. Disconnect switches should indicate plainly that the cover holding bolts are to be tightened securely at all times before operation of the switch. A periodic inspection should be made of the switches to insure their proper functioning in the places for which they were designed.

In Article 32 of the National Electrical Code, hazardous locations are divided into four classes and each class is described by listing representation hazards.

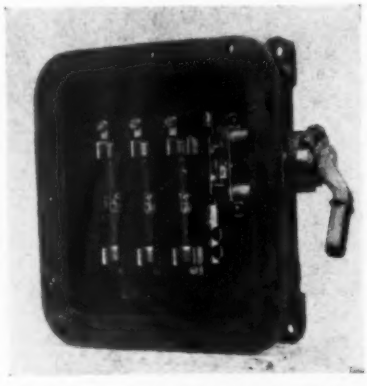
An amplification of these representative hazardous locations with interesting comments may be found in a series of articles in ELECTRICAL CONTRACTING on "Explosion Proof Wiring" by E. W. Gustafson, chairman of the Article 32 Committee of the National Electrical Code.

Referring specifically to manually operable disconnect switches, we will treat each of the above four classes separately.

Because Class I locations deal with explosive vapors, gases, and the like, safety switches for this use have been designed on the premise that the enclosures cannot be made absolutely gas-tight. They have, therefore, been so built that should the switch enclosure fill with an explosive mixture any resulting explosion within the enclosure will not mechanically harm the enclosure nor will gases be released to the atmosphere outside of the enclosure at temperatures high enough to ignite this outside atmosphere. To meet these requirements, the switch is enclosed in a heavy cast metal case designed to withstand, with a good factor of safety, any pressure that may be built up in the case interior due to an explosion of gases present in the hazardous location for which the switch is designed. Then, further, the flanges or vents, through which gases escape to the outside atmosphere when an explosion may occur within the case interior, are held to very close fit and at the same time a sufficient length of path to the outside atmosphere is provided so that no gases reach the outside atmosphere at a temperature high enough to ignite the external gas mixtures. The cover and case of these enclosures are, therefore, provided with close fitting flanges and closely spaced holding cap screws or bolts of sufficient size that the cover may be tightly drawn down upon the body of the enclosure. The rotary operating means for throwing the switch from "on" to "off" position or vice-versa operates through a close fitting bearing or in the case side, again providing clearances that will insure the proper cooling of any gases that may escape through the exterior of the case as the result of an internal explosion. The conduit entrance holes are threaded for receiving conduit with a sufficient number of pipe tap threads to insure a close fitting joint at this point. The covers further carry warning indications that the cover holding bolts must be turned down securely at all times.



A. A 600-amp., 575-volt, fusible dust tight weather-proof safety switch.

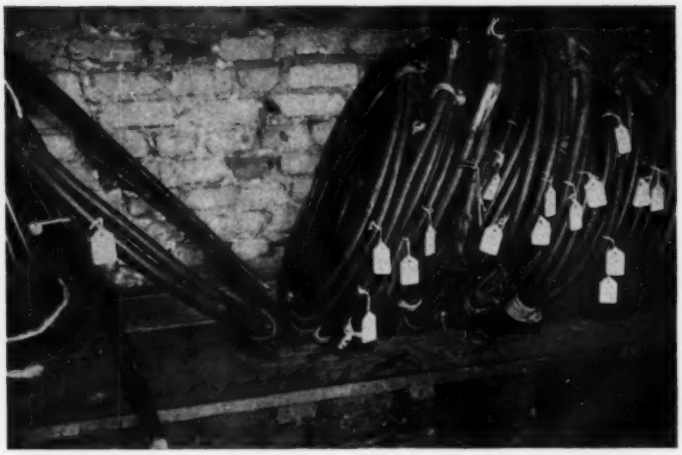


B. A 30-amp., 575-volt fusible safety switch for Class 1 D and 2 G locations.

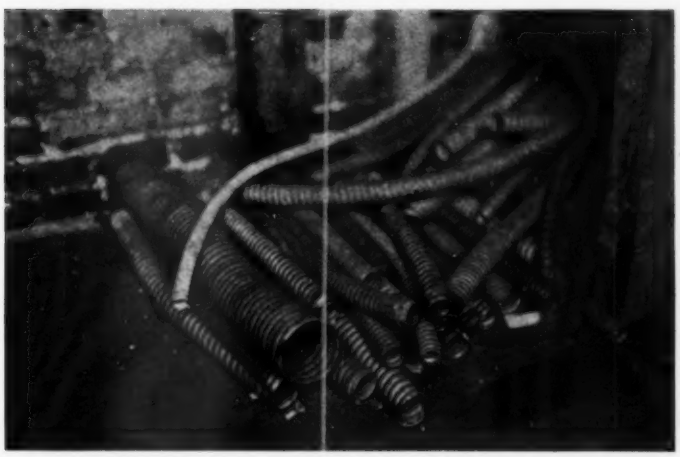
Under Class II location the Code requires dust tight equipment. To meet these requirements, safety switches have been developed which closely follow the basis of design required in Class I locations, except that the enclosures are not made of as heavy a cast construction because of the lower pressures resulting from explosion within the enclosure of the hazardous dust mixtures involved. The width of the cover flange is probably $\frac{3}{4}$ in. as compared with 1 in. to $1\frac{1}{2}$ in. required for Class I location. The same close fit of cover flanges, operating means connected to the outside of the enclosure and conduit entrance are maintained. The cover holding bolts are in most cases of lighter material than those required for Class I locations, and in many instances are provided with wing nuts for convenient fastening of the cover.

Under Class III locations Underwriters' Laboratories have not set up standards for apparatus intended specifically for Class III or Class IV locations, which have the same requirements, because switches listed for Class II locations are considered suitable.

Odd cable lengths are accurately gauged from a standard stranding reference chart, then measured, coiled and plainly tagged.



Handy shelf space is reserved for odd coils of cable where good light permits the quick selection of properly tagged pieces.



Flexible steel conduit is often used in rather short lengths, thus it pays to keep all odd pieces available. There is no occasion for handling heavy coils on jobs which require only several short lengths of various sizes. Careful mechanics can order such lengths quite accurately.

Rigid conduit scraps are kept at a minimum by maintaining a simple stock sheet for pieces of 2-in. and larger, whether threaded at one or both ends, or bald

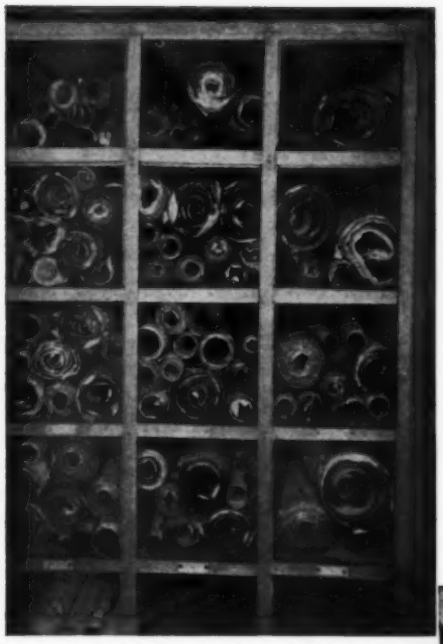
Short Lengths Stock-keeping

THERE is a marked difference between junk materials and scrap or short lengths of new materials under the stockroom methods of the Dennison-Loepker Electric Company of St. Louis, Mo. Very little waste of odd pieces of rigid or flexible steel conduit, or insulated cable occurs, because it is constantly kept under control.

A little cooperation between foremen, stock clerk and superintendents causes short lengths of new materials to be worked in. These items are kept in an orderly and get-at-able manner, and records are easily maintained which permit the odd lengths being definitely assigned to jobs.

Often a piece of cable is ordered which happens to measure slightly longer than an odd length in stock. In some cases these shorter stock pieces are found to be acceptable, when longer cuts would otherwise have been made.

The returning of short lengths from jobs is said to have psychological advantages from the customer viewpoint, and it likewise stimulates greater care about material among the wiremen. There is no extra cost involved in such housekeeping practice, since it is done by the stock clerk in his spare time. In many cases a net profit accrues because a large amount of non-creditable short material can be applied to good uses. This firm has installed the wiring for several large newspaper plants, warehouses and other industrial and commercial projects, but a steady program of conservation has held its material waste to a low figure.



Pigeon holes for storing blue prints are 48 in. deep and 9 in. square, with a hinged door concealing them. Each compartment is given an alphabetical designation.

The records for each large job are stored in individual letter boxes, rather than being placed in the large transfer files. The name of job, and job number is printed on these boxes, thus making it possible to look up past job details quickly.

Each roll of blue prints is labeled with a serial number and lettered to correspond with its bin. The "M" bin close-up view contains rolls labeled "M-1", "M-2", etc.

Simplified

THE importance of adopting a reliable method for filing and preserving job records and data needs no proof. The principal problem, is how to do it simply and inexpensively, and furthermore, how to do it in a business which involves several persons who must all have access to old records and various data from time to time.

The office methods of the Kelso-Wagner Company of Dayton, Ohio, offer a good example, because this organization's operations are quite complex, both from a standpoint of diversified heavy construction and also due to the fact that a staff of seven executives conduct the business. Nevertheless a simple system was found workable which held down routine and the need for costly office furniture. Firms that are operated on a much smaller scale can easily adopt similar methods to advantage.

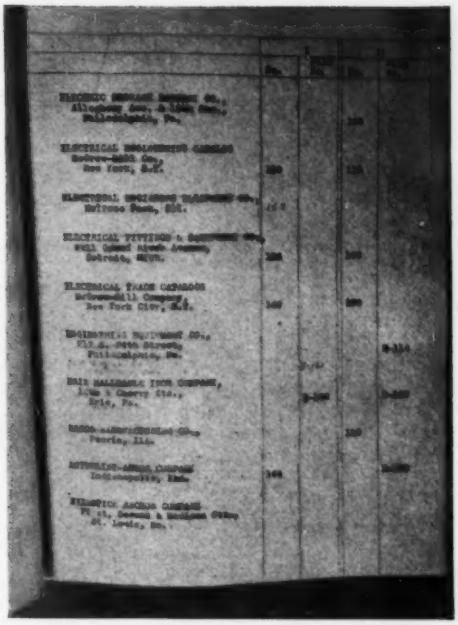
Three fundamental phases of office detail which vitally concern every established contractor, are: (1) Completed job records, (2) job plans and working details, and (3) engineering, estimating and sales data. Regardless of how the books are kept, or the kind of office forms employed, or the particular school of estimating that is favored, these three problems remain more or less the same.

This company follows a universal practice of job or order numbers, with lettered prefixes to distinguish between construction work and apparatus or equipment sales. Standard steel file cabinets are used for storing these records during the year. These records include all correspondence relative to estimates, design, purchase, payments, claims, adjustments, etc., which pertain to that job. When a year has elapsed they are transferred to paper transfer file boxes. Because such equipment is inexpensive and lends itself to out-of-the-way storage, the old job records can be retained in their complete order for a number of years. All large operations which accumulate heavy files are kept in individual letter boxes, so as to be more portable and more accessible for future review.

Most contractors prefer to keep a record of completed jobs. This entails the storing of the general plans, and also the contractor's own detail or working drawings. Very little time is lost by this company when such old drawings are wanted for review. They are rolled and stored in a recessed dustproof rack which is divided into compartments. Each compartment is labeled in alphabetical order, and the rolled plans contained therein are labeled to correspond. For instance the "M" compartment contains rolls labeled "M-1", etc.

Quick reference to plans is possible by means of a 3-in. by 5-in. card index of all plans that are in storage. These cards are filed under alphabetical tabs, and contain the name of the project, also a list of drawings on file. Each bound set of drawings, and each separate sheet of working detail is entered on this card, and states the file number with which it has been labeled. For instance an "M" card may show that the master drawings are labeled "M-15", but that a specifically described detail drawing is labeled

The job papers and correspondence concerning old completed jobs are stored in labeled transfer files. These inexpensive files relieve congestion in the regular office files, and cut down office furniture costs without throwing away valuable records of old jobs.



A loose-leaf binder contains typewritten lists of all catalogs and bulletins kept on file. Columns that appear on these lists permit the designation of whether such data are in file No. 1, No. 2 or in both files. The numbers are marked on labels attached to such data, thus permitting their being filed correctly.

Office Data Filing

"M-21." Thus, if seeking this detail, it is possible to confine one's search to the "M" compartment of the drawing storage rack for a roll labeled "M-21."

Because this company engages quite extensively in power plant and transmission line construction, there are many detail drawings prepared for its own records. These often run over several years, or are modified from time to time because of additions or alterations to plants or systems. To simplify the history of such drawings, they bear a new series of consecutive numbers for each calendar year. The drawings of one year are readily distinguished from those of another year by prefixing the number with a letter. Each letter prefix represents a calendar year. Thus drawing number "R-921" would be one that was prepared in 1923, while number "P-921" would be for the year 1925. (The reverse order of the alphabet was chosen when this plan was inaugurated.)

Engineering Data File

Very complete data and catalog files are kept up to date. These are divided as between bound catalogs and thin bulletins. Likewise two sets of storage or filing cabinets are necessary to serve the engineers who cannot all conveniently work from one central file. Because certain engineers are more concerned with civil and mechanical engineering data than the other group of mainly electrical engineers and estimators, it is not necessary that both files be supplied with identical material.

A loose-leaf master index binder was developed as a record of all catalogs and bulletins at hand. This record comprises typewritten letter size sheets in a ring binder, and includes the names of all manufacturers in alphabetical order. When the master list was made up, each item was given a number, but numbers were skipped in between to permit the future insertion of new names and numbers in proper order.

Each typed page contains a four-column ruled space following the name. Two of these columns are used for inserting the file numbers of catalogs or bulletins for file No. 1, and the last two columns are used in a similar manner for file No. 2.

This master index book will therefore quickly inform an engineer where a certain rarely used catalog or bulletin may be found, or that it is not on file. If it is on hand, its file number appears in the catalog column of file No. 1 or file No. 2, or both, or in the bulletin columns, if it is a bulletin. Because bulletins are usually restricted to a small number of pages, and rarely have stiff covers, they are kept in file drawers with numbered separating tabs at intervals to facilitate finding them quickly.

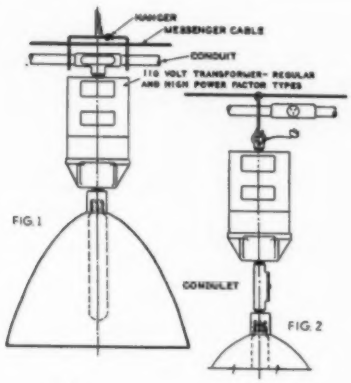
Each catalog is tabbed at its bound edge with a gummed label bearing its file number. Thus when they are ready for replacement in the file case the number tab permits their being kept in correct order. This obviously avoids lost time for the next person who needs the same data.

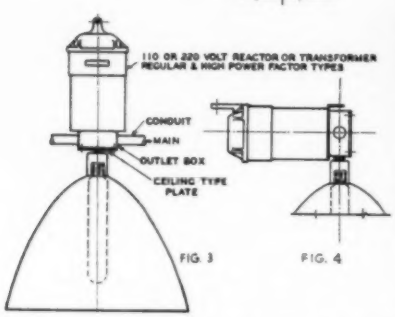
The wide selection of catalogs that is kept on file by this company resulted from direct voluntary mailings, and from checking the various industry or trade catalog directories. A cross reference listing of manufacturers by products is not necessary to this system because of these trade directories. After the directory is checked against the file index, an ample supply of data is usually found to be on hand.

Construction . . Methods . . . .

Supporting Methods for Mercury Vapor Lamp Units

Because the new mercury vapor lamp requires an individual transformer or reactor for each lamp outlet, such installations can be simplified by employing integral mount-

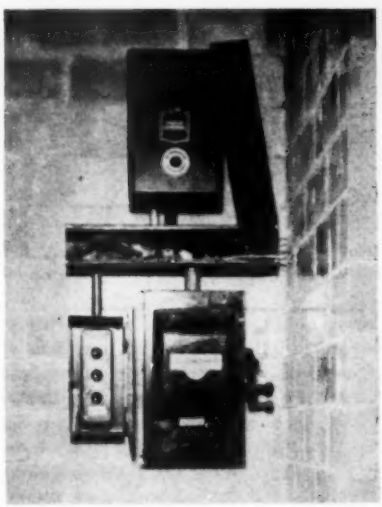




ings or assemblies. A majority of these installations have so far been made in industrial buildings and at high elevations, and with exposed wiring. Fig. 1 suggests a method for suspending the transformer and reflector from the ceiling upon messenger cable, using threaded conduit fittings for direct connection to the top hub of the transformer case. An auxiliary pipe support dropped from the ceiling is shown connecting the saddle hanger. This vertical rod relieves the messenger cable which supports the conduit, of the lighting unit weight. Fig. 2 suggests a method of suspension whereby the unit is plugged in, and may be readily taken down for maintenance purposes. No auxiliary ceiling support is shown. Fig. 3 would apply for locations where the transformer was fastened to the face of a beam or projecting surface that would allow reflector clearance below. This method illustrates the use of a knockout at the base of transformer, from which the reflector is supported. Fig. 4 suggests a ceiling mounting method, with the transformer attached horizontally, and an outlet box against the bottom end. The reflector is nippled from a side knockout so as to place the lamp in a vertical position.

Concealed Conduit Connection to Surface Equipment

The conduit for eleven motor-operated door motors in an armory at Baltimore, Md., was concealed behind vitrified tile. At each controller



location there were four conduits which were stubbed out horizontally and terminated in a 4-in. by 4-in. by 21-in. surface mounted screw-cover steel junction box. Nipples were then installed into the magnetic controller above, and to a 60-amp. motor disconnecting switch and the "Up," "Stop" and "Down" stations, below this junction box. This installation was by the H. P. Foley Company.

Toggle Fastenings for Steel-Joist Conduit Work

The exposed pre-fabricated steel joists or trusses in the garage of this "modern" Long Island home provided the only logical surface for running the exposed lighting conduits. The conduits and outlets were easily installed and effectively supported with cast iron one-bolt clamps and toggle bolts. The bottom truss member was made up of two angle-irons with sufficient space between them to permit a toggle being shoved through, which, after being firmly taken up, provided a mechanically secure support for the clamps and for the outlet boxes. The use of bolted grabbler, or perforated iron

was considered by Whitson McKay, Inc., of Garden City, N. Y., to involve too much cutting and forming labor, as compared with this less conspicuous and more substantial method.

Wireways Overcome Space Handicap

The crowded conditions in a service equipment room caused Ralph S. Walter, electrical contractor of Bethelehem, Pa., to change from conduit outside the room and use two wireways from a point on the ceiling to the distribution panels. Because these wireways were available in short flanged-out sections, it was possible to build them up along the ceiling outside the equipment room, despite the presence of several large pipes which could not then be removed. These pipes would have interfered with running into the equipment room with the seven feeder conduits that were terminated in the

WHO CARES ABOUT THOSE CORNERS?

PERHAPS even the user himself doesn't care very much whether or not the corners of his safety switch boxes are tight and square. Perhaps it doesn't matter whether or not the box front closes easily or must be slammed.

But such things matter to Cutler-Hammer. They matter because C-H believes that Safety Switch performance is a matter of detailed perfection . . . and so *every* detail is vital.

Look to the other C-H Safety Switch details — the true, strong hinges — the flake-proof finish that resists corrosion — the clean-cut, extra-quality switch hooks — the precise way in which the blades engage their clips — the snap and certainty of operation — *all* details, and every one well engineered. Compare C-H Safety Switches with all others, detail for detail, and convince yourself!

Cutler-Hammer's attention to details explains the preference for Cutler-Hammer Safety Switches, and explains why they are featured by alert contractors and independent electrical wholesalers everywhere. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Avenue, Milwaukee, Wis.

● *The C-H line includes all types and sizes of Standard, Weatherproof and Explosion-Proof Safety Switches, and Meter and Range Switches for every locality—all built to the famous C-H Control Leadership Standards.*

CUTLER-HAMMER C-H SAFETY SWITCHES

wireways. The verical sections of wireway could not be placed equal distances from the wall because of these pipe obstructions. Because of

the floor height at which the wireways had to enter the equipment room, a number of right angle pulls were eliminated by the wireway installation.

Switchboard-Mounted Motor Control Stations

A layout which enabled the locating of forty-two motor remote control stations upon a large main distribution switchboard while also

isolating the many control and pilot wires from the feeder cables was employed by the H. P. Foley Company in wiring the Fifth Regiment

WHAT? No contact maintenance on Bulletin 709 Solenoid Starters?

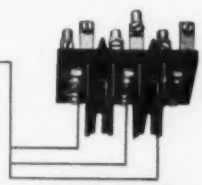
It can't be true, say most maintenance men. It has never been done, before!

But for Bulletin 709 Solenoid Starters—it's HANDS OFF! Positively, never dress the contacts. The special silver-alloy contacts—the straight line contactor motion—the freedom from rebound have eliminated contact maintenance. The low pick-up and drop-out voltage of Bulletin 709 Solenoid Starters makes them ideal where line conditions are bad.

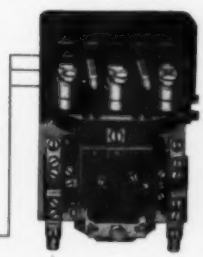
Follow the usual procedure! Install a Bulletin 709 Solenoid Starter—and FORGET IT! It will give a lifetime of satisfactory service. Only in rare cases of exceptionally severe service will worn-out contacts have to be replaced.

Bulletin 709 Starters are available in 3 sizes up to 30 H.P., 220 V., 50 H.P., 440/550 V. in a wide variety of cabinets. Send for Bulletin 709, today!

Allen-Bradley Co.
1307 South First Street, Milwaukee, Wis.



● **Stationary Terminal Block:** Double-break silver-alloy contacts removed from arc hood to show arc barriers.



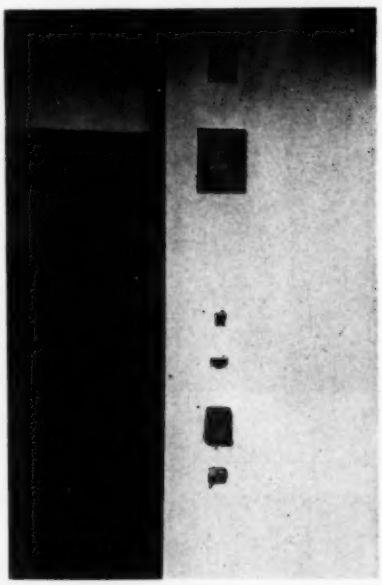
● **Moving Contacts:** Travel in straight line motion—no troublesome, flexible jumpers—front of arc hood is removed to show moving contacts in arc chambers.

ALLEN-BRADLEY
Bulletin 709 Solenoid Starters

Armory at Baltimore, Md. A 35-in. wide, 37-in. high, and 6-in. deep steel cabinet was installed on the end of the main switchboard from which an 18-in. by 2½-in. metal wireway was run upward and over the top of the main pullbox. The various motor control circuit conduits from motor-operated doors and windows, and from fans and unit heaters were connected to the pullbox and wireway at the opposite end of the switchboard.

Plumbing Separate Tandem Outlets

The problem of obtaining true perpendicular alignment for the center lines of several outlets which are in tandem, or above each other, is



illustrated in the rough, as recently observed at a new high school in Utica, N. Y. Here the Langdon & Hughes Construction Company had many such outlet groups, comprising from top to bottom: (1) flush clock outlet; (2) radio speaker; (3) volume control; (4) temperature control (not electrical); (5) wall telephone outlet; and (6) a two-gang switch. The foregoing outlets were stubbed in for rough masonry in a reasonably plumb position. After the metal corner bead was applied in readiness for plastering, the final plumbing operation was done to align with this corner bead. Any misalignment was corrected by trimming off enough of the rough tile next to the outlet to permit springing and wedging the box in line, and then grouting it into the set partition. The flexibility of these stubs was enhanced by having run some of the conduits in the rear.

Three Types . . . . One Quality

Under the familiar trade-name **"BUCK-EYE"**, you will find **Hot Galvanized, Electro-Galvanized and Black Enameled Conduit**... each possessing the high quality so long recognized by expert craftsmen. When you install "BUCKEYE" you install the conduit which has a twenty-four year reputation throughout the building trade.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - - YOUNGSTOWN, OHIO

Service Shop . . . Practice . . . . . .

Foot-Operated Coil Clamp

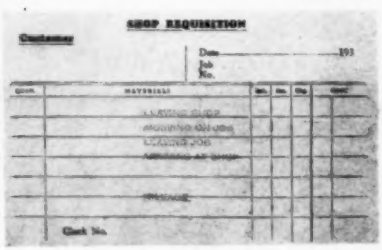
A bench-mounted clamp with which to hold stator coils for special taping was made by the M. H. Salmon Electric Company, Inc., of Syracuse, N. Y. This clamp is operated

by a floor pedal or lever to apply a two-direction compression against the coil. It is used for holding formed sheets of fish paper in a tight assembly around stator coils while the workman has both hands free to apply final wrappings of cotton tape. This extra application of coil insulation is used for reinforcement of the cell length.

The clamp consists of a vertical flat steel bar, bent over to form a shoe at the top. This bar is pulled down by the floor pedal against coil spring tension until the shoe has compressed the coil against a horizontal steel bed plate that rests on two vertical pipe nipple posts. A second clamping member slides upon the bed plate toward the coil as the pedal is operated. This action is produced by placing a second vertical pull-rod with its retrieving coil spring to operate a link and clevis that forces a sliding steel plate toward the coil by lever action. A pipe sleeve extends through the bench for this latter rod to operate up and down freely. Because both rods are coordinated by their relative positions on the floor lever, the operator can release the foot pressure instantly to free a coil and move it along ahead of the taping process. Both hands are always free to wrap the coils tight and evenly, to obtain uniformly compact reinforcement.

Zone Chart for Mileage Charges

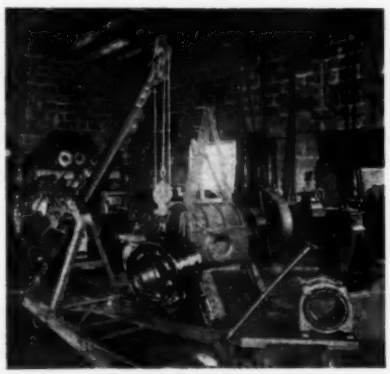
A uniformly zoned mileage allowance for the use of private cars is made for all service men employed by Berger Brothers Electric Motors, Inc., of Rochester, N. Y. To avoid confusion or the possible abuse of trip mileages, a large map of Rochester was zoned by circles occurring



on this map in steps of ½-mile radius from the shop. This map is framed and hangs beside the shop time-card rack, where each man checks in when an outside call has been finished. A shop requisition must be filled out for auto mileage, which is based upon the round trip allowance which is marked on the map within the zone in which the call was made. If this requisition is not made out, the customer will not be charged nor will the workman receive his allowance. Each mileage requisition also includes a record of the actual time when leaving the shop, arriving at the job, leaving the job, and arrival back at the shop. With this complete record it is possible to check customer complaints about labor charges more accurately. If a complaint is made about the length of time spent in traveling, or actually on the job, this can be analyzed in detail. Likewise a stop-over by the workman, while en route to job or shop will also be clearly evident to the management.

Floor Cranes for General Shop Use

Because the General Electrical Service Company's shop at Harrisburg, Pa., does not lend itself to an overhead traveling crane, due to the distance between its lengthwise outer



walls, a 1½-ton portable floor crane is used instead. Its boom length permits heavy stators or rotors to be hoisted into dipping vats, ovens, lathes and upon truck platforms. Small three- and four-wheel dollies are used for trucking heavy equipment about the shop without the need for rolling the large crane about except where it is needed for hoisting purposes.

Accessible Bearing Stock

To obtain the correct size and type of sleeve bearing quickly, the Mather, Evans & Diehl Company, Inc., of Utica, N. Y., arranged a wall rack with evenly spaced nails on five

horizontal boards for hanging up their new stock. Each size bearing is kept on a wire loop which is


it
STICKS
HOLDS
LASTS
BULL
DOG
Friction
TAPE
BULL
DOG
FRICTION
TAPE
IT STICKS - IT HOLDS
IT LASTS
BULL
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CAMBRIDGE, MASS.

threaded through the lot, and is identified with a large shipping tag. An old bearing can easily be compared with those in stock by measurement or by placing it alongside the new ones. This method is preferred to bins or drawers because the condition of staple stocks is always quickly checked, thus preventing a shortage of popular sizes. This shop does not keep a regular stockman and therefore must have its material arranged so as to be convenient to various persons at all hours.

Turn-Table Work Stands

Workmen may revolve equipment that is under repair to the desired position for obtaining the proper light, and for quick access to various sides of heavy rotors, starters, etc.,

through the use of revolving-top work stands in the service shops of the Electrical Installation Company, Cambridge, Mass. It is not necessary to walk around to the various sides of the work, but instead, the mechanic is able to revolve his work and remain in one position that is handiest to various tools, materials, light source, and away from trucking aisles or hoistways. These stands are used in stripping stators, winding, cleaning, spraying, painting and assembling work.

Sales Help for Brush Business

Sixty types of brushes are displayed near the service counter of the Electrical Maintenance and Engineering Works of Woonsocket, R. I. Much valuable time is saved for customers and counter men by having this display where old brushes may be quickly compared with those on display. Each of the larger sizes is labeled with its catalog number and retail price. When a comparison has been made with an old sample, the

JEFFERSON Super-Lag Fuses Eliminate Needless Motor Shutdowns

Your customers must pay men whether they are busy or "stopped". Unnecessary blowing of fuses on motor circuits causes delays that mean lost production. . . . You can increase your fuse sales by explaining how Jefferson Super-Lag Fuses prevent losses.

Jefferson Super-Lag Renewable Fuses provide reliable, accurate protection—riding over harmless, momentary surges—operating positively on extended, dangerous overloads. There is no better protection for electrical equipment and property—and against payroll loss for STOPPED TIME. There is no better way to increase your fuse sales than pushing Jefferson Super-Lag Renewable Fuses.

Made in all capacities—knife-blade and ferrule types.

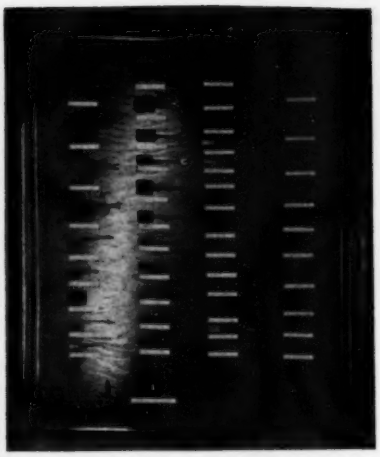
Fuse Chart—FREE

A handy guide to selection of proper size fuses at a glance, for the adequate protection of motors. Ask for Fuse Chart No. 18.

JEFFERSON ELECTRIC COMPANY
Bellwood (Suburb of Chicago), Illinois
Canadian Factory: 535 College St., Toronto

The secret of Jefferson Super-Lag performance lies in the lag plate which is a part of the Super-Lag link. This plate retards the normal fuse action, provides a time interval or lag. This time-lag prevents the fuse from blowing on harmless temporary overloads—saves needless shutdowns and link replacements.

JEFFERSON Super-Lag RENEWABLE FUSES



price and catalog number are immediately known, thus eliminating any further delay in filling the larger number of such over-the-counter orders.

Compact Small Parts Cabinet

Special service contracts often involve certain standard items of material that should be kept apart from the general items of contracting supplies. For building, repairing and remodeling luminous tube signs, Joseph Rotondo of Easton, Pa.,

found that certain types of small screws, brads, rivets and corresponding sizes of drills and taps should have a separate cabinet. A small wooden wall cabinet was built which provides shelf space for various handy tin trays containing these essential items. A ½-in. board was fastened flat to the lower left side of this cabinet. Holes were drilled down into the upper edge of this flat board for keeping eight most commonly used sizes of taps within easy reach of the assembly bench below the cabinet.

DAYTON COG-BELT DRIVES

SAVED THE COST OF AN ADDITION TO THE SHOP

●The owners of the shop were purchasing a large machine. They thought they'd have to build an addition to house the motor. But investigation showed that no extra room would be needed if Dayton Cog-Belt Drives were used, because the motor and machine could be mounted on extremely short centers.

This is typical of many cases where Dayton Cog-Belt Drives are saving valuable space in factories, shops, and mills of all kinds. It suggests an important reason for adopting Dayton Cog-Belt Drives when remodeling old machinery or installing new.

Besides eliminating long spans of belting, Dayton Cog-Belt Drives afford other worthwhile economies. They require minimum tension and are consequently easy on bearings. They need no dressing, do not slip, and do not fly off the pulleys, thus providing maximum uninterrupted production. Furthermore, they give exceptionally long service with practically no maintenance expense.

Dayton Cog-Belts have many other advantages due to their laminated "built-to-bend" construction. They are accurately die-cut and snugly fit the grooves of all standard pulleys. Their crosswise firmness prevents squashing and distortion, and there is no twisting or weaving. This means no slippage, smoother running, less strain on machinery and bearings, and longer life.

Obtain all the facts about Dayton Cog-Belt Drives. Write us for information and descriptive literature.

THE DAYTON RUBBER MFG. CO.
DAYTON, OHIO

The World's Largest Manufacturers of V-Belts • Manufacturers also of Dayton Fan Belts, Dayton Red Tube Radiator Hose and the famous Dayton Thorobred Tires and Tubes

Dayton
COG-BELT DRIVES

COG-BELT DRIVES • F.H.P. V-BELT DRIVES • V-FLAT DRIVES • COMPLETE DRIVES, PULLEYS, AND BELTS IN STOCK • FRACTIONAL TO 100 H.P.

Code Chats . . . . .

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Motors on Lighting Circuits

Is there any place in the Code where it is stated that a 10 or 25 H.P. motor must not be put on a branch lighting circuit.

Yes, this is quite definitely covered by the Code.

Bearing in mind that by ordinary lighting circuits we do not include mogul lamp holder circuits we find lighting circuits confined to only the "15-amp. branch circuit" classification as given in 2005 (1933 Code).

Then in rule 2005-a-3 we find the maximum limitation of 1320 watts for any appliance which may be used on any 15-amp. branch circuit. As a 10 or 25 H.P. motor uses more than this 1320 watts it would, therefore, not be permitted on a branch lighting circuit.

Border Light Wiring

I have some border lights to rewire in a school auditorium. They are home-made borders and are not wired according to Code specifications.

Section 3603-h states, "For wiring borders, asbestos-covered wire, Type A, or slow burning wire—Type B, shall be used."

Section 3603-d and f states that either conduit or armored cable shall be used. The lights that I wish to rewire have to be wired with armored cable and I would like to know what is the proper wire to use and where I may obtain same.

The general method for wiring border lights is to have the lamp holders mounted on a trough through which the circuit wires are run. Due to the great amount of heat encountered asbestos-covered or slow-burning wire is required.

There are, however, instances, such as are encountered in school buildings where the regular type of border trough is not employed. In some cases armored cable might be used between outlet boxes in which the lamp holders are mounted.

However, if the wires are subjected to temperatures in excess of 120 deg. F. then armored cable could not be used. In such cases asbestos or slow-burning wires in rigid or flexible conduit or electric metallic tubing could be used.

CABLE FAILURES: A group of six 2,200-volt, 3-phase feeder cables which recently failed in a Buffalo, N. Y., industrial plant necessitated a 36-hour temporary replacement job. This work was done over the week-end by the Ferguson Electric Construction Company before this plant could resume operations. The failure occurred at a splice in a 3-conductor No. 2 cable, and spread to the remainder of the cables that were grouped in a large junction box. Close examination was said to have revealed improper make-up of these joints, poorly wiped lead sleeves, and a lack of compounds. Because of the extensive damages that resulted, it was necessary to provide temporary feeder connections, because the job conditions will only permit the re-splicing of one cable at each week-end until they have all been properly repaired.

Insulation Resistance

Why does the Code not require that all metal jobs should be tested for grounds, and such grounds removed, the same as required for fixtures?

The Code may not quite so definitely require a test for grounds on a wiring job as it does for fixture work, yet sufficient provisions are included in the Code.

Rule 513—(1933 Code) requires that a completed installation shall have resistances in accordance with the table given.

Any inspector, therefore, may invoke this rule on any job which he suspects may not be free from grounds.

Exposure to Mechanical Abuse

What would you consider subject to mechanical disturbances? Would the cable on outside of building exposed on weatherboard below outdoor meter box which is located 6 ft. from ground be considered as being subject to mechanical injury?

Cables installed within 7 ft. of the ground on the side of a building adjacent to a driveway, walkway, or playground, etc., and where liable to contact with awnings, shutters, swinging signs, or other movable objects, are considered as subject to mechanical disturbance.

Separate Services

A customer has a 3,000-watt, licensed, amateur transmitting set that requires a 3-wire, 110-220-volt feed. The present service is 2-wire, 110-volt. We thought of putting the transmitter on a separate service, due to the fluctuation that occurs when transmitting at the full 3,000 watts. Is it permissible under these conditions to install two separate services?

The rules of the Code do not permit the use of more than one service into any one building, except for very extenuating circumstances. To prevent fluctuating due to the use of a radio transmitter is not generally one of the extenuating circumstances. Also, there is a question as to whether or not a separate service for the transmitter would entirely prevent the objectionable fluctuation, and possibly it may be eliminated without employing a separate service.

If the transmitter was to be fed through a separate service from a separate transformer, then probably

the fluctuation on the lighting circuit in the house would be eliminated, but if the separate service was merely to connect to the same transformer, and the transformer is already overloaded, then the fluctuations would not be prevented. If, however, the transformer now supplying the building is not already overloaded or loaded pretty nearly to full capacity, the fluctuations may be lessened so as not to be objectionable by the use of a larger service line—that is, one with a greater carrying capacity.

Service Entrance Cable for Ranges

In our September Code Chat we said, in part, "The 1935 Code will further permit the use of the bare neutral type of ASE cable for electric ranges only providing the cable has a non-metallic outer covering, etc. . . .

Our attention is called to the fact that this should have read, "ASE and SE cable, etc."

It should be borne in mind, however, that type SE cable is not designed to withstand mechanical abuse and should be used only where not subject to mechanical injury. Type ASE is much more preferable for this use than type SE.

PURCHASES NEW QUARTERS: Capitalizing the low market for old commercial property, J. K. Scrimgeour of the Scrimgeour Electric Co., recently purchased and renovized a three-story and basement building in Worcester, Mass., for new company quarters. No sooner was this done than came a nice increase in business. This work included the remodeling of a large restaurant which had been operated since 1849. This is being re-wired for air conditioning and about 85 kw. of electrical cooking. A large store re-lighting installation and a $51,000 contract for the city hospital addition are other nice jobs in progress. Mr. Scrimgeour is vice-president of the Worcester Electrical Contractors Association.

ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

Reduce Bootlegging

ELECTRICAL inspectors are frequently heard to complain that they could do much more to reduce the bootlegging of wiring if the contractors would work with them. This should not be difficult to accomplish, particularly as bootlegging is something that all worthwhile contractors want to see abolished.

While there is, of course, the natural repugnance of men to tattle, it is possible to work out a reporting plan that business men will be glad to follow. Because conditions are virtually the same everywhere, it should be possible to work out a standard plan and for such work we might suggest a joint committee from the two national associations representing the inspectors and the contractors.

Labor Shortage

CONTRACTORS in a number of cities now report a scarcity of trained electrical mechanics. In some places the contractors could bill a larger volume if more men were available to do the work.

While the same problem is being faced by other industries it is much more serious with the construction industry because so many men have left it to engage in other occupations that have less idle time. As business returns it will be found, particularly in industrial centers, that the ranks of building mechanics have been sadly depleted by the opportunities for steady employment offered by manufacturers. Large numbers of fine electricians have forsaken the uncertain employment of construction for a smaller hourly wage, but a regular pay check as factory maintenance men. Some of these men might come back, but it is doubtful if many will be willing to trade their security for uncertainty, though the hourly rate be twice as high.

In addition to a change of employment, old age, illnesss, death and change of occupation have further helped to cut down the numbers of available good mechanics. The shortage today is caused not so much by new work as by modernization, additions and jobbing work. A slight upturn in new construction will greatly accentuate this labor shortage.

While something should be done by the industry to build up the labor supply, this takes time. Contractors must, therefore, find methods and tools that will enable them to get the work out in less time. There are undoubtedly many places in the practice of wiring where different methods, new tools, or more supervision would cut down waste time.

Range Wiring Overhead

HOW much differential should a contractor have to cover overhead and profit on range wiring? This is a question that will have to be answered sooner or later. The utilities are buying a large part of the range wiring today, and so long as the money is coming out of their pockets, they will be much interested.

So far in many cities the larger contractors have refrained from doing this class of work on the grounds that the price allowed was too low. In this issue are presented some figures from Portland, Ore., where the contractors are allowed $23.00, the power companies furnishing some of the material. A study of the cost figures of the contractors shows a 15 and 10 per cent margin. In some cities 10 and 10 have been allowed.

Certainly such overhead figures are below the normal overhead of a contractor, but are they enough for range wiring? In other words, to what extent does the omission of sales and collection costs reduce overhead? And while this matter is being debated, it might be well to consider other factors that might have a bearing on overhead on range wiring, such as: Flat price versus estimate on each job, a job at a time or a group of jobs, have arrangements been made to have job ready for wireman as soon as he arrives; who delivers the range, uncrates it, and sets it up, what responsibility rests with the contractors once the installation has passed inspection and been accepted by the power company?

There is a wide price range for this class of work. While a study would show that in almost every instance these prices were justified, the obvious conclusion without such a study is that the contractors are robbers.

There is little reason why range wiring practices should differ all over the country and still less reason why the practice of placing this work should vary. Some suggested standards worked at jointly by the contractor and utility associations should help materially to reduce the existing confusion.

Sacred Cows

THERE have been certain elements of the electrical business that for years have been almost sacred. To discuss them publicly was sacrilege. Some disaster was feared if they were not held inviolate.

One such sacred cow is electrical safety. Public education on the hazards of electricity has been discouraged on the grounds that an admission of hazard would make the public so afraid of electricity that less energy would be consumed. Years ago when electricity and gas were battling for supremacy in the field of artificial illumination, there were undoubtedly good grounds for soft pedaling anything that might be used against the industry. Today, however, there is nothing to take the place of electricity and nothing to fear from the standpoint of competition. Furthermore, the public today is used to safety education of one kind or another, and takes it not through fear, but to learn how better to use the hazardous product.

Take the automobile, for instance. Does the publicity given to poor brakes or badly worn tires reduce the amount of automobile driving? Or does it not result in the sale of more brake lining and more tires?

Just so long as the industry soft pedals the life and fire hazards of electricity, just so long will we continue to have bootlegging of wiring, cord wiring and other poor installations that make it difficult for the public to have the kind of service that the industry is set up to give. A building with old and defective wiring is certainly not using as much energy as it would were the installation made safe and brought up to date.

As soon as the industry is willing to slay this sacred cow and start a unified program of public education, we shall see business increase as a result. The inspectors are making a splendid effort in this direction. One insurance company is making a fine contribution through a motion picture and some displays. What we need, however, is the active cooperation of the entire electrical industry.

Economic Selection

THIS fall thousands of young men will enter college. After four years of this kind of mental training, most of them will go out into the field of business where some will succeed but many fail. Will the failures and the mediocre ones brand a college education as undesirable, or will the successes characterize this training as something worth while?

A parallel is to be found in the electrical contracting business. Each year thousands enter the field and each year thousands leave it. Out of the newcomers, however, are some who will stick and progress and sooner or later become industry leaders. Is it a bad business because so many fail, or a fine business because it offers so much opportunity to men of ability but small financial resources?

The real electrical contracting industry is represented by the progressive units—the companies that have lifted themselves out of the large group of very small contractors. In volume they do between 80 and 90 per cent of all the electrical contracting work.

The group representing between 10 and 20 per cent of the entire volume is much larger in number, but is in effect on trial. It is, nevertheless, a very essential group to the industry, because from it are recruited the contractors of tomorrow.

The law of the selection of the fittest rules in this group. Some survive only a short time, others just manage to hang on for years, never getting out of this lower bracket, while a few push forward.

Is not this process of economic selection good for the industry? Does it not really mean an industry of strong men who have known some degree of success?

While this large group is always going to be a problem, its members should not be condemned for their general lack of achievement, but rather their ranks should be combed more carefully in order to discover those of merit. The industry needs all of the good men it can get.

N.E.C.A. News..

Material for this department is supplied by the headquarters staff of the

National Electrical Contractors Association

420 Lexington Avenue, New York, N. Y.

President	Vice President	General Manager
E. N. Peak	Louis Kalischer	Laurence W. Davis
1603 West Main St.	17 Bergen St.	420 Lexington Avenue
Marshalltown, Ia.	Brooklyn, N. Y.	New York, N. Y.

N.E.C.A. Invited to Washington Conferences

In a communication from Maj. George L. Berry, appointed by the President as coordinator for industrial cooperation, the N.E.C.A. has been invited to engage in round-table discussions in Washington with industry leaders "for the purpose of conferring upon the advisability of developing a permanent structure, contemplating the furtherance of prosperity and stability in our industrial life."

Major Berry stated in his invitation to the N.E.C.A. for round-table discussions that "it is my belief that conferences of the character suggested by the President at which frank discussion of the problems can be had with the hope that understandings can be arrived at, will be of lasting benefit. In a word, these conferences are intended to identify the facts and to act upon these facts intelligently and constructively."

Contractors and Utilities Reach Understanding

L. E. Mayer, chairman of the N.E.C.A. joint committee which met with a similar committee of the Edison Electric Institute on September 10, reported to the Executive Committee that a favorable development of understanding of the mutual problems of electrical contractors and the utilities resulted from the conference.

The following resolution of the joint committees, which had been adopted at this conference to be submitted to the respective bodies for consideration and ratification, was unanimously approved by the N.E.C.A. Executive Committee:

"It is the opinion of this committee that electrical utilities and electrical contractors each have an economic position in the electrical industry and that each should do everything in its power to firmly establish and sustain the other in its legitimate sphere. There should be established within national and local organizations the definite principles that contractors and utilities should through proper committees continually confer nationally and locally with a view of establishing certain principles of operation that will advance the interests of the electrical industry."

Joseph Appointed to Electrical Committee

The Executive Committee has appointed Theodore H. Joseph of the E-J Electric Installation Co., New York City, to serve as alternate representative of N.E.C.A. on the Electrical Committee, N.F.P.A., replacing R. A. Goeller, who has served in that capacity for a number of years and who has asked to be relieved because of increasing responsibilities in his own business.

Mr. Joseph has served on the Electrical Committee in the past and is an authority upon the National Electrical Code. He was recently appointed as a member of the industry to serve on the Subcommittee on Fuses.

Mr. Joseph has been designated by the N.E.C.A. to represent it on the following Article Committees:

Article 5—Wiring Methods.
Article 10—Rotating Machinery and Its Control Apparatus.
Article 16—Electrical Appliances.
Article 50—Circuits and Equipment Operating at More Than 600 Volts Between Conductors.

N.E.C.A. Collects Wage Data

Questionnaires have been sent out by the N.E.C.A. to electrical contractors in over 1,000 cities and towns throughout the country to gather statistics covering the wage rates now prevailing. This survey, when completed, will be published by the National Association and distributed to all members.

This is the first complete survey of wage conditions in the electrical contracting field which has been made since the termination of NRA codes, and the data gathered is expected to be of unusual value in showing the present trend of wages since the removal of the minimum wage base in the Electrical Contractors Code.

Data on wage rates existing in all communities is one of the important services of the N.E.C.A. and is essential information to contractors figuring on projects at distant points.

Committee on Distribution Active

The N.E.C.A. Committee on Distribution under the chairmanship of Ralph M. Walker is actively engaged in developing a nation-wide committee of industry leaders for the carrying out of the program. The organization plan calls for the appointment of leaders in every state and district of the country, such districts to be geographically defined, the responsibility of these leaders being to establish state and district committees to handle the complete organization in their territories.

The committee's ultimate objective is effective local organizations in every community in the country, carrying on a simultaneous program of education of contractors, wholesalers and manufacturers, these local organizations being welded into state organizations, and then through regional councils of state groups obtaining complete coordination of the program through the National Association.

The program affects every electrical contractor in every city and community in this country. The aim of the N.E.C.A. is to get back for the contracting industry the position formerly occupied regarding electrical construction. To accomplish this it is necessary that there be maintained proper differentials between contractors and consumers whereby electrical contractors may become the most effective marketing outlets. In order to get the proper differentials it is necessary to have strong organization of electrical contractors in such position that it can be respected by manufacturers and jobbers. The manufacturers and jobbers must have assurance that if contractors are given proper preferentials as compensation for the distribution service which they render, such preferentials will not be misused for unfair competition.

The Committee on Distribution has had discussions with influential members of the various branches of the industry and has found a receptive attitude, indicating that the plan is considered sound and for the good of the whole industry. The Committee on Distribution urges every electrical contractor to hold himself ready to carry out his part in perfecting the local and state organizations essential to the success of the program.

● Easier to erect means easier to profit.

Alcoa Aluminum Bus is light to handle and easy to work. Permanently efficient joints are made either by bolting or welding with equal facility. Fittings are simple, *and* economical.

There is at least a 52% saving in weight when you use Alcoa Aluminum Bus. That means a lighter, less expensive, supporting structure.

With these advantages, Alcoa Aluminum Bus in the form of rectangular bars, tubes and structural angles or channels permits construction of the various units of an electrical system in a manner best suited to normal and abnormal conditions.

The ability of Aluminum to resist the corrosive attack of most industrial fumes, particularly those of a sulfurous nature, as well as acid fumes from plating tanks, is an exclusive advantage.

Be sure to figure Alcoa Aluminum Bus on your next job. Complete data are yours for the asking. ALUMINUM COMPANY OF AMERICA, 1897 Gulf Bldg., Pittsburgh, Pa.

ALCOA · ALUMINUM

Contracting.... News.....

New York Contractor Conferences

Pursuant to the abolishment of the N.R.A. code, the contractors of six cities in the state of New York have formed a conference group for the purpose of discussing mutual industry problems. A series of meetings was begun in August with delegates being present from the local contractor associations of Buffalo, Rochester, Syracuse, Utica, Albany and Binghamton. These meetings are rotated so as to be held every six weeks in one of these cities. Delegates are sent there from each city at the expense of each local group. The discussion of labor agreements, voluntary codes, legislative matters, wholesaler trade practices, and other timely topics are major subjects of these conferences.

Bay State Jobbers Pledge Contractors Aid

A gratifying response from medium-sized and smaller wholesalers has been received by the Massachusetts State Association of Master Electricans in connection with a plea for better price cooperation sent broadcast throughout the Bay State a few weeks ago by L. H. Barrowclough, secretary. The association membership has been stressing the electrical contractor as a logical outlet for merchandise, but has been considerably disturbed of late by alleged unfair differentials in prices offered by jobbers between contractors and consumers. The letter from the association proposed the following schedule of discounts:

On Fixtures, 20 per cent differential between consumer and contractor.

On Wiring Supplies: List or double contractor's cost to the consumer; contractors' prices on firm order to the industrial with electrical maintenance department; list price to the industrial without such a department.

On Appliances: 30 per cent off on firm order to industrial with electrical maintenance department; list to industrial without above department; list to the consumer; 35 per cent or more according to discount, to the electrical contractor.

Twenty-four jobbers have accepted this schedule to date, most of them expressing their accord with the association's desire for a fair profit for the contractor on a labor and material basis, and recognizing the evils of "chiseling". by jobber-consumer price cutting.

Boston Contractors Elect Officers

At the annual meting of the Master Electricians' Association of Boston held on October 7, John J. Reddington was reelected president; Frederick Dudley, vice-president; George W. McShane, secretary; and Frank Kennedy, treasurer. The officers and the following will constitute the board of directors: Robert Black, Andrew Fassitt, Morris Feldman, M. A. McMahon and Henry Miller.

Buffalo Modernized Lighting Contest

A sales contest which provides a series of cash prizes based on the wattage of new lighting equipment installed to replace that which is obsolete or inadequate, is now under way at Buffalo, N. Y., under the sponsorship of the Electrical League of the Niagara Frontier. This drive for modernization of lighting equipment which began September 16, calls for prizes to be given bi-weekly with a grand prize at the conclusion, on December 5. Electrical contractors and other salesmen of electrical equipment are eligible, and rules have been drawn up to clarify the scoring of points. Sales made to new structures are not counted, nor are sales made to general modernization operations wherein lighting equipment would be purchased in connection with complete remodeling. In four weeks this contest brought sales reports totaling 221,900 watts of equipment.

Wiring Market Improves

Improved conditions in the market for electrical construction are reported from every section of the country to the N.E.C.A. by members of its Executive Committee. New construction continues spotty, but the outlook is getting better. Modernization work is very active, and is expected to continue for some time.

The reports show the following:

R. W. McChesney, Washington, D. C., Eastern Division.

The outlook is bright for residential construction in the lower price brackets. Commercial and industrial construction, on the other hand, is still very quiet, although there are reasons to believe that these will become active in the near future. Modernization work is the bright spot and this is expected to continue for some time.

W. W. Ingalls, Miami, Fla., Southeastern Division.

This year has been one of Florida's biggest building years since 1929, and 1936 will exceed 1935 in residential, commercial and modernization wiring fields. Practically every contractor in the state is busy now.

The prospects in and around the central part of Georgia are very good for 1936.

The Virginia contractors, as a whole expect next year to far exceed 1935.

Louis Kalischer, Brooklyn, N. Y., Vice-President.

The building of small homes will continue on a much larger scale. In the apartment house field there is a great deal of activity in new construction and this will become much greater when the present activity in modernization of the properties taken over by loan institutions is completed. I not only look for good business, I believe there will be a shortage of some of the materials and skilled labor. It's entirely possible, if the credit jam is broken too suddenly, we may even have a runaway market.

D. B. Clayton, Birmingham, Ala., Southern Division.

Building is increasing considerably in most of the Southeast, but is "spotty" depending to a great extent on the local conditions in the large cities. In Alabama there is very little work going on of a residential character, except a few very inexpensive residences. The commercial work is not uniformly good. There is quite a bit of remodeling work going on. There is practically no industrial work, the only work of any importance in Birmingham of an industrial nature being the result of two big fires. This applies fairly well to most of the Southeastern area as far as private work is concerned. Government work constitutes the bulk of the new building in Alabama as well as other southern states. There has been a huge amount of government money from PWA given to city and county Boards of Education for alterations on present buildings,

Be certain your next TIME-SWITCHES *are*

SANGAMO

The SANGAMO Time-Switch shown here may be had in either electrically wound (Form VW) or synchronous motor (Form VS), single or double-throw.

1. Slow-Speed (240 r.p.m.) high-torque Sangamo self-starting synchronous motor. Unconditionally guaranteed.
2. Available for any commercial frequency.
3. Forty-ampere capacity.
4. Small gap, slow-opening mechanical contacts—proven thoroughly dependable.
5. Three "on" and "off" operations for each 24-hour cycle.
6. Manual operation without disturbing sequence.
7. Sunday and holiday cut-out.
8. Dust-proof mounting.
9. Pry-outs, back and bottom.

Because Sangamo Time-Switches have that extra value that the highest quality materials and accurate craftsmanship can give them.

Because this extra value means consistent, accurate and dependable service that develops customer satisfaction and good will for you.

Because uninterrupted and consistently accurate service means the elimination of costly service calls that cut down your fair and legitimate profits.

For these reasons, be certain to order Sangamos from your jobber the next time you need time switches. They can be depended upon for efficient, accurate performance at all times.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

extensions and in many cases entirely new school buildings.

R. J. Nickles, Madison, Wis., Great Lakes Division.

This report is submitted solely on a basis of conditions in the State of Wisconsin. There has been a pronounced pickup in the better type of residential work. Added wiring is being installed for such things as air-conditioning, exhaust fans, and in many cases circuiting of larger capacity is being specified. There has been very little activity in connection with the remodeling or rewiring of business properties, excepting in a few instances where window illumination has been revised along more modern trends. Very little industrial work is under way.

H. C. Evans, Kansas City, Mo., Central Division.

Kansas and Missouri have a well laid program which will equal the PWA fund provided. Bonds were voted in the State of Missouri to cover construction and remodeling of penal and other buildings amounting to $10,000,000, which sum is equaled by PWA. It now seems as if there would be at least nine hundred homes built in Kansas City this coming year. Commercial and industrial buildings amounting to about ten million dollars are in sight for the Greater Kansas City area.

E. N. Peak, Marshalltown, Ia., President.

Business in general is fair in this section, but the electrical industry is very quiet. Building is showing an improvement and prospects for next year are very encouraging. There is a general feeling of optimism.

Lloyd Flatland, San Francisco, Calif., Pacific Division.

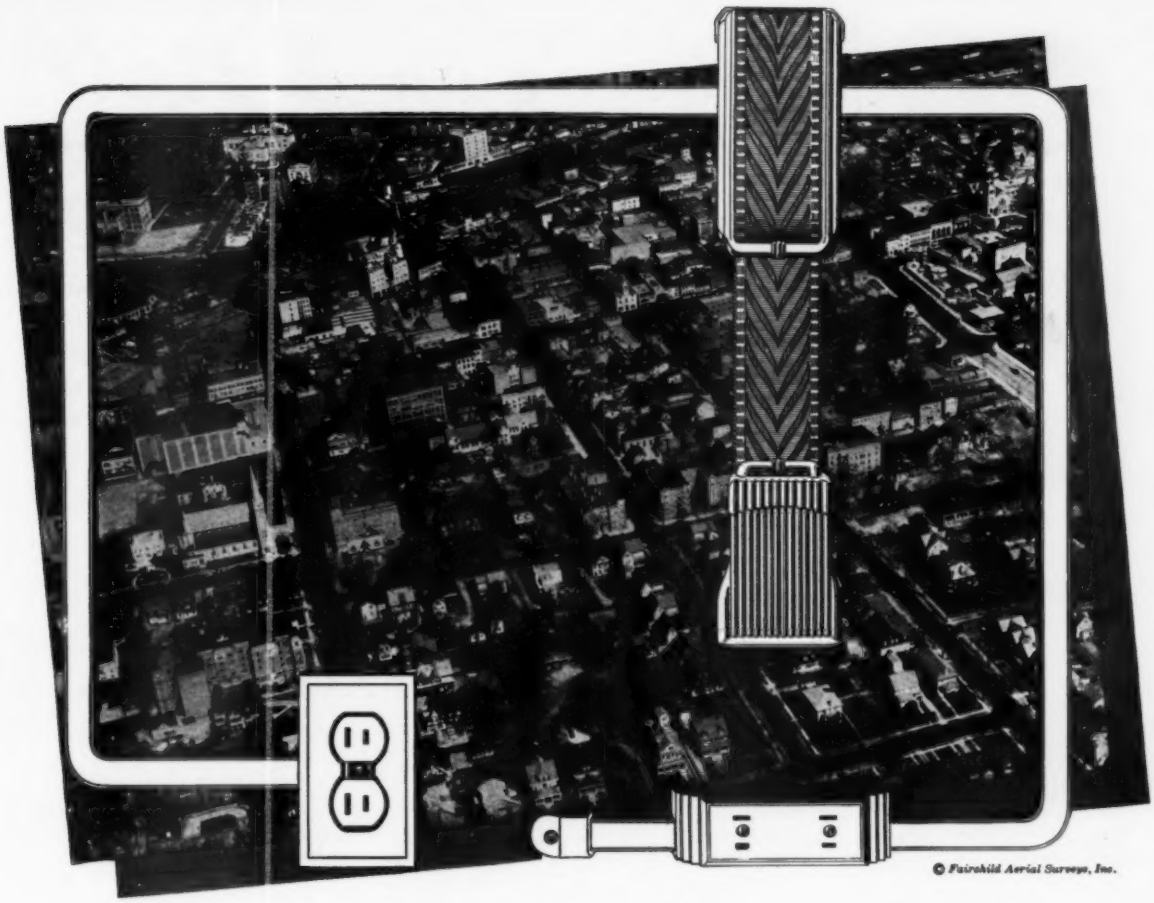
The construction industry on the Pacific Coast shows a marked improvement over the same period for last year. Building permits for new construction are at least 100 per cent more than at any time for the last two years. Residential construction appears to be most active. Construction employment and payrolls show vast gains. The industrial wiring business has improved considerably. Merchants in all sections are improving their business establishments, installing new show windows and store fronts. The electrical work on all of the above items is small and individual jobs seldom exceed much over $300.

G. W. Patterson, Toronto, Canada, Eastern Canadian Division.

In Eastern Canada we are progressing favorably and are more than holding our own and feel assured that the steady improvement will continue. The outlook for residential business is good, with an improvement in 1935 of 45 per cent over the previous year.

J. H. Schumacher, Winnipeg, Canada, Western Canadian Division.

The electrical and building business for 1936 in Western Canada holds a very promising outlook. Repairs to homes and business premises gained considerably during the past year.



A NEW PICTURE OF YOUR WIRING MARKET

With the development of Bryant AddHere Surface Extension Wiring, *millions* of already-wired buildings have come into your picture as logical prospects for wiring. They are literally *new* prospects for *new* business . . . for business the electrical industry has been losing because of makeshift extensions by non-electrical people. Every AddHere job is an *addition*—not a replacement—in the total of legitimate wiring business.

To the contractor, this new wiring picture offers an opportunity that's a "natural" in today's conditions. Bryant AddHere lines up 100% with the newly adopted policy of the National Electrical Contractors' Association:". . . to reduce the cost of electrical installations through developments in wiring methods and installation practices consistent with the safety and convenience of the public. . ."*

*From a resolution presented by Earl N. Peak, President, and unanimously adopted at the 33rd annual convention of the National Electrical Contractors' Association.

Bryant ADDHERE SURFACE EXTENSION WIRING

For complete information, write

THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK CHICAGO SAN FRANCISCO

A Roll o' Tape

Electrical Flashes gathered among the big wire and pipe men

by
Electrical Contracting's Field Editors

ONLY four pieces of fibre underfloor duct were broken during the recent installation of 3,000 ft. of this material by the Dennison-Loepker Electric Company, in a St. Louis (Mo.) office building addition.

LOCAL association matters are foremost with "Tom" Grady, Grady Electric Co., of Albany, N. Y., after which he finds time to serve as president of the Tri-City group, comprising Troy, Schenectady and Albany.

WITH over 100 electric ranges sold by October 1, as compared with about 25 per year in the past, F. H. Newman of F. W. Newman & Son, Inc., Albany, N. Y., has made appliance sales bring in some welcome wiring jobs.

MORE than 30,000 sockets are used in connection with the various types of outdoor lighting outfits that are kept on hand by the Ford Electric Company, of Washington, D. C. Special effects are made up for outdoor displays, expositions, etc. One of the larger jobs last year comprised the decoration of forty private yachts.

TIME study comparisons show good reasons why industrial electrical contractors can justify the services of their skilled mechanics and efficient tools in competition with plant electricians. Harry Newmark of Morris Newmark and Bros., Philadelphia, Pa., reports an instance where an industrial customer's plant mechanics drilled a 3½-in. hole in a steel cabinet in eight man-hours. Newmark's crew performed the same operation, while doing other work near the plant crew, in

PANTHER & DRAGON
Tapes
EVERYWHERE

PANTHER and Dragon Friction and Rubber Tapes are outstanding among commercial tapes because they are backed by the reputation and experience of the Okonite Company, for over half a century a leader in the insulation field. This accounts for such features as longer life, greater tensile strength and adhesiveness, distinctive green cores, and for the Cellophane wrapping sealed around each roll.

HAZARD INSULATED WIRE WORKS
Division of
THE OKONITE COMPANY
Factories: Wilkes-Barre, Pa. Passaic, N. J.

exactly thirty minutes. The plant men lost time in laying out, scribing and center-punching the cabinet, then drilled a circular series of small holes, after which followed a laborious task of filing the burrs caused by this method. Newmark used a motor-driven hole cutter for their job.

CHANGEOVER jobs are usually thought of as individual plant problems, but the French-Gerleman Electric Company, of St. Louis, Mo., enjoyed the distinction of conducting such work for a power company on a larger scale. Several Illinois communities having up to 4,500 meters in service were changed from d.c. to a.c. equipment.

BECAUSE Charley Bobe of the Paul Wendt Electric Company, St. Louis, Mo., made a thorough study of automatic heating and air conditioning control equipment on the first such installation for a large manufacturer, the completed installation paved the way for a desirable line of specialized work.

THE preparation of job specifications on variously colored paper for the general, electrical, heating and plumbing, and ventilating sections has been inaugurated by George W. Scutt, mechanical engineer of Reading, Pa. The first project for which such specifications were completed is a $400,000 local school, just out for bids.

INEXPENSIVE rubber stamps are made up which bear the name of each large operation that is commenced by the Keystone Engineering Corp., Reading, Pa. All requisitions, time slips, sketches, etc., bear this stamped designation, thus avoiding any chance of records being placed with the wrong job papers or of the wrong job name being written upon a work record.

F. H. BRENNAN of the Duvall Electric Co., Albany, N. Y., clings to the theory that with patched stator windings of smaller motors averaging 40 per cent as much as the cost of completely rewinding the job, there is no sense in doing a patch job. Furthermore, complete rewinds can be guaranteed, while patch jobs are only a doubtful remedy.

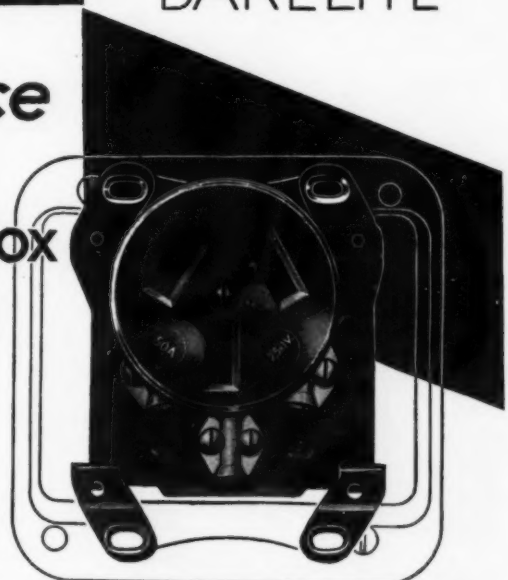
THE correction of erroneous customer opinions about small motor operating defects makes it necessary to provide complete and understandable visual testing apparatus in the small motor repair department, says W. H. Bigelow of the Warren-Bigelow Company, Worcester, Mass. Authentic performance charts must be available for proving the readings shown by the test. Many complaints are the result of poor line voltage on the customer's premises, improper belt tension, or excessive com-

ARROW

FLUSH Range Outlet

made of BAKELITE

For neat appearance



Takes 4-inch Standard Box and Standard Cover!

DESIGNED to take advantage of your fast-growing residential building market *and* the increased demand for electric cooking... Straight-in wiring with solderless connections ensure fast, easy installation... Takes standard square 4" wall box and standard 2-gang raised switch cover... With these economy-features is the added attraction of MODERATE PRICE.

Receptacle is of BAKELITE, designed for use with new Bakelite Range Cap No. 7952 or standard rubber connection cords. The plate — standard brush brass finish — has ground slots and contacts. Sets FLUSH in the wall, out of the way and goes neatly in shallow residential partitions.

Catalog data at right is for use in making up your requirements.

NEW FLUSH RANGE OUTLET	Std. Pkg.	Carton
No. 7987 — Receptacle only	10	2
No. 7988 — Plate only, .040"	10	2
No. 7989 — Plate only, .060"	10	2
No. 7990 — Receptacle and .040" Plate	10	2
No. 7991 — Receptacle and .060" Plate	10	2

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

pressor back-pressure. The customer must be convinced by demonstration tests that correct repairs were made, and that some such foreign condition is at fault.

The wiring of Albany's new radio broadcasting transmitter station WOKO represents the fifth job of this kind for the Stearns Electrical Construction Corp., of Albany, N. Y.

The ten members of the Albany (N. Y.) Electrical Contractors Association are listed alphabetically on a small printed card. This card is supplied to representatives of the electrical workers who may have occasion to refer prospects to licensed contractors.

WHAT becomes of old issues of trade publications? was asked of the electrical inspector staff in Milwaukee, Wis. It seems that a system of selection through the city library staff results in various articles and data becoming removed and segregated under subject groups. Thus a reference library comprising magazine articles on the Code, ordinances, trade practices and methods, and numerous other subjects is being added to constantly.

A hard job to chisel, reports F. H. Henzel of the Henzel Electric Co., Albany, N. Y., after doing a $9,000 rewiring job in a remodeled school board building. It required over 2,000 ft. of wall chases; a 38-in. stone wall had to be drilled for underground services, and many other stone walls averaging over 2 ft. thick had to be pierced.

AMONG the interesting personnel combinations in large contracting and engineering firms we find the Kelso-Wagner Company of Dayton, O. C. M. Kelso, a former water works engineer, and M. H. Wagner, an electrical engineer, have surrounded themselves with electrical, civil and mechanical engineers for handling the many power plant, transmission line and industrial installations and appraisals to their credit in various central states.

MONTHLY graphs showing the average volume of construction, motors, motor repairs and general sales are kept on a consolidated plotting sheet by M. H. Salmon of M. H. Salmon Electric Company, Inc., Syracuse, N. Y. Instead of plotting the sharply fluctuating monthly totals, the curves are more uniform because of showing averages. At the end of each month the accumulated total for the preceding twelve months is divided by twelve, for an average result. This type of record has been kept by Mr. Salmon for many years of operations.

New Products . for November . .

Time Switch

A line of general-purpose automatic time switches, type T-17 for indoor or outdoor use, and type T-27 for indoor use only. They employ Telechron direct drives and quick make and break silver contacts. Designed for 115 and 230 V. a.c. circuits at a current rating of 40 amps. per contact,

they can be had in single and double-pole, single or double throw triple-pole, single throw, or two-circuit separate break. Plain, astronomic or combination dials can be furnished. The type T-17 switch is equipped with an omitting device which permits one or more days being skipped if desired. General Electric Co., Schenectady, N. Y.

Bench Type Grinder

A grinder having a flat-faced motor housing which permits the grinding of long steel bars or other objects without interference from the motor frame, while they are held in a horizontal grinding position. Wheel guards of heavy steel are said to be adjustable to permit work over the entire circumference of the grinding wheels, while adjustable tool rests may be set in any

position and to compensate for wheel wear. Rubber insulating feet are provided to minimize the noise and vibration of grinding. Two 6-in. by ¾-in. grinding wheels are furnished, one coarse and the other fine. The motor has dust-sealed bearings and is rated ¼ hp., 3,450 r.p.m. for 110-volt, 60/50-cycle operation. Several useful shaft attachments are to be had for drilling, sanding and buffing. Diehl Manufacturing Co., Elizabeth, N. J.

One-Side Friction Tape

A line of "masking" or one-side friction tape with paper or cloth backing. It is used for cleaner and neater wrappings for small tools; repairing air and water lines; temporary splicing; and other operations. Both "Jonflex" (cloth backed) and Permacel (paper backed) types are made in 60 yard rolls and in widths from ¾ in. to 36 in. Mitchell-Rand Insulation Co., New York, N. Y.

Meter Service Switch

More easily accessible fuses are claimed as a result of providing a slid-

ing cover to enclose the branch circuit fuses on a line of meter service switches. A twistout for making trough connections to these switches has two small rectangular pieces on the outer edge which is said to permit its easy and quick removal by a twist of the pliers. Changes in design have allowed the use of a smaller enclosing case. The 30-amp. 125-V., 2-pole switch is shown. Cutler-Hammer, Inc., Milwaukee, Wis.

Ganging Type Switch

A switch with removable side walls which may be used in single installations, or connected together in groups of two or more by removing side walls in a manner similar to sectional switch boxes. Because the opening of the main door disconnects the circuit, no side switch lever is employed, thus a ganged group of switches takes up no extra room. A metal trim

covers the wiring and connections, while the fuses are dead when accessible. This switch is available in three pole, two and three-wire solid neutral, and straight two-pole. Square D Co., Detroit, Mich.

Electrician's Bit

No. GA-5 electrician's bits are made of special heat-treated bit steel for long life and hard usage. Deep screw points with durable cutters and polished edges are said

to aid in fast boring. They are finished in golden bronze and are available in the standard $\frac{13}{16}$-in. size, 10 in. long overall, packed ½ doz. to the box. Irwin Auger Bit Co., Wilmington, O.

Rubber and Friction Tape

"Plymson" friction tape and "Plymite" rubber tape are supplied in individual ½-lb. tins, and are recommended only for the most critical electrical jobs. The friction tape is guaranteed against deterioration for three years, and the rubber tape is claimed to contain 60 per cent rubber, with an elongation of 300 per cent. Plymouth Rubber Co., Inc., Canton, Mass.

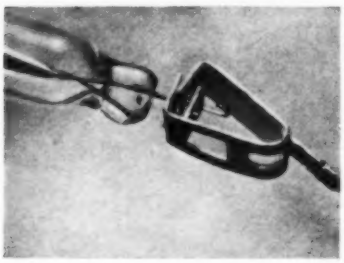
Interference Filters

A line of seven types of "Filtercons" for use with small motors, heating pads, vibrators and neon transformers

for the prevention of high-frequency impulses on the supply lines, thus reducing noise in radio receivers. These filters are rated to carry 5 amp., a.c. or d.c., and are made in plug-in types for use between radio receivers and power lines, while others are provided with mounting straps for attachment directly to the apparatus. Continental Carbon Co., Cleveland, O.

Neon Tube Connector

Spring clip-on connectors designed for use in combination with heavy nickel wire hooked-post electrodes. These are claimed



to be shake-proof and will permit service men to connect or disconnect neon sign letters from the front without having to reach inside the sign. These Fahnestock No. 70 clips have been designed to be pulled through any porcelain bushing, while a small hook on the end of the nickel post is said to prevent the spring connector from coming off. Voltarc Tubes, Inc., Newark, N. J.

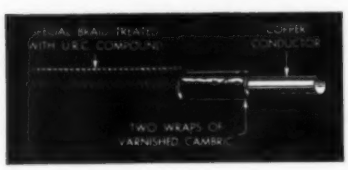
Swing-Out Circuit Breaker

A line of 15-50 amp. industrial circuit breakers which are mounted on hinged metal pans that may be swung out and away from the box. The entire box area

may thus be used for bringing in conduit and wires without obstruction. An open space between the back of the box and the interior permits the wires being run underneath the base without danger of pinching them or damaging the insulation. The external operating lever is permanently engaged with the bakelite breaker handle so that there is no danger of breakage when the swingout interior is opened or closed. This unit can be had for 125, 125/250, 250 v.d.c., or 250 and 575 v.a.c., in two or three poles. Square D Co., Detroit, Mich.

Weatherproof Wire

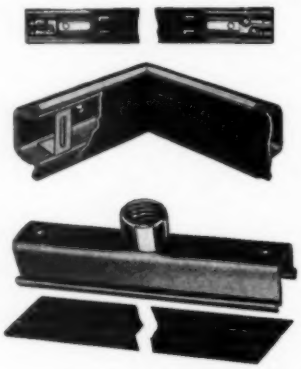
A line of weatherproof line wire employing specially treated outer braid over two wraps of varnished cambric insulation. Greater resistance to deterioration or rotting of braid, and increased dielectric strength are claimed for this product, resulting in less danger from fallen high-



voltage lines; greater safety to linemen; lowered construction costs, because lines may be erected closer together; reduced arcing of touching or swinging conductors; lessened grounds. Made in solid wires from No. 20 to 4/0, and stranded from No. 12 to 2,000,000 C.M. Stranded wires from 600,000 C.M. have three wraps of varnished cambric. General Electric Co., Schenectady, N. Y.

Plug-In Wiring Channel

A wiring system comprising metallic raceways or channels, known as "Plug-in" strip, which provides plugging outlets at 6-in. centers. It is manufactured in one, two, three, four and five-foot lengths or units, ready for installation. Five fittings, consisting of two types of elbows, couplings, end



fittings, and junction boxes provide the accessories with which the "Plug-in" strip can be installed to fit any size room. An empty "fill-in" raceway channel is also available, which may be cut into any desired shorter lengths for routing supply conductors to the actual sections of "Plug-in" strip.

The strip is made of 1⅞-in. wide zinc treated channel that encloses continuous lengths of buses. These buses are in pairs and are wedged in place

within strips of insulating sheath or liners. Their contour is such as to provide spring contact tension to take the prongs of a standard attachment plug. A face plate of sheet composition material covers the front of these strips and is punched at 6-in. intervals for inserting the prongs of an attachment plug.

Supply circuit connections may be made by means of a junction box fitting, to either end of any length of strip. The strips are electrically interconnected with small jumper straps. Branch circuits may be run to various sections of this strip for proper distribution of load by the installation of "home run" junction boxes wherever the strip is to have another circuit.

This system is recommended for use in residences, apartments, offices, and other places where outlets are wanted at very close centers to limit the need for lengthy cord connections. It may be incorporated in wooden baseboards by providing a ⅛-in. channel in the base; or by removing the capping, installing the strip, and replacing the capping above the strip. It can also be recessed in the plaster, or installed on the surface. It may be painted any desired color. National Electric Products Corp., Pittsburgh, Pa.

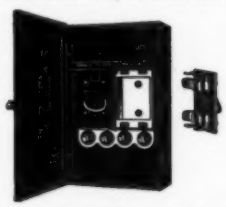
Expansive Bit

Two cutters are provided with each GA-4 expansive bit, to bore any size hole from ½ in. to 1½ in. Added pulling power

and superior boring qualities are claimed because of extra deep screw point threads. A golden bronze tempered color finish is provided. Irwin Auger Bit Co., Wilmington, O.

Service Entrance Unit

A pull-cover type assembly employing "Renu-Fuse" units for the main switch and fuses, and for the range circuit disconnect and fuses. Two water heater circuit terminals and either two, four or six lighting



circuits are also provided. This assembly is available for flush or surface mounting, and has a dead front which is removable without disturbing the circuits or without removing the pull covers. Ample wiring space is claimed for this compact unit, because of the construction of its interior mechanism. The Wadsworth Electric Mfg. Co., Inc., Covington, Ky.

Mercury Tube Toggle Switch

A compact toggle switch which tips a sealed mercury tube, making and breaking the circuit by the flow of mercury. It is designed for a.c. or d.c. circuits and has a non-inductive rating of 30 amps. 125 v., and 20 amps. 250 v. A surface type steel case encloses the tube and connecting block, while its chromium finished toggle lever is mounted outside. This switch is

recommended for controlling lighting or motors in oil refineries, grain elevators, chemical and rubber plants, or in other locations where exposed arcing would be dangerous. The Hart Mfg. Co., Hartford, Conn.

Trade Notes . . .

Littelfuse Laboratories, Chicago, Ill., announces having moved to larger quarters at 4238 Lincoln Ave. from its former location at 4507 Ravenswood Ave.

Clifton Mfg. Co., Inc., Boston, Mass., announces the appointment of Moncrief and Graf, 56 West 22nd Street, New York, N. Y., as its representatives in the metropolitan New York territory.

Steel and Tubes, Inc., Cleveland, O., announces the formation of a new sales district from portions of its New York, Philadelphia and Birmingham districts. J. C. Boyd, formerly of the Brooklyn, N. Y., sales organization has been made the new district manager in charge of sales in North and South Carolina, Virginia, Maryland, Delaware, Southern New Jersey, including Trenton; also southeastern Pennsylvania. Other personnel changes include the transfer of J. F. Keeler from Cleveland to head eastern sales promotion work; I. H. Anderson transferred from Philadelphia to Brooklyn; and J. S. Anderson from Detroit to the new Philadelphia office. J. D. Benfield and Robert Turrell, former sales representatives have formed an organization known as Turrell & Benfield, Inc., with headquarters at Detroit, Mich., and are representing Electrunite Steeltubes and Fretz-Moon conduit products in the Michigan territory.

Manufacturers' Bulletins . . .

Safety Switches: Catalog No. 35 comprises fifty-two bound pages with supplements covering the Palmer line of safety switches, load side switches, entrance switches, meter connection boxes and test blocks, socket type meter troughs, combination range and distribution devices, outdoor meter cabinets, range receptacles, emergency remote control switches, and other accessories. The Palmer Electric and Mfg. Co., Waltham, Mass.

Control and Distribution Apparatus: A loose-leaf Bull Dog catalog with stiff binder, containing 122 pages of products, and additional pricing sheets. Safety switches, meter service switches, range switches, Fusenters, lighting and distribution panels, switchboards, circuit breakers, Kbl-Duct, Trole-e-Duct, Electro BUStribution systems, wire grips, and other accessories are covered. Bull Dog Electric Products Co., Detroit, Mich.

Arc Welding Handbook: Contains 586 pages divided into eight sections with over 700 illustrations. Subjects covered as follows: Welding methods and equipment, technique of welding, procedures, speeds and costs for welding mild steel; structure and properties of weld metal; weldability of metals; designing for arc-welded machinery and structures; applications; and advertising section. Domestic price, $1.50 per copy. The Lincoln Electric Co., Cleveland, O.

History of Light: A booklet for school children entitled "Light Through the Ages," printed in colors. Designed as a part of the promotional plan for the 1935-36 Better Light-Better Sight movement, copies are available at $50.00 per thousand. The story of light is told from prehistoric times to modern mazda and gaseous illuminants of today. Each phase of the story includes a small picture and caption describing in brief the actual light source of each individual period. A companion scrap book is also available which enables students to paste up and write their own history of light, following the outline of the booklet. Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of Electrical Contracting, published monthly at New York, N. Y., for Oct. 1, 1935.
State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Glenn Sutton, who, having been duly sworn according to law, deposes and says that he is the business manager of Electrical Contracting, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Electrical Trade Publishing Co., 330 West 42d St., N. Y. C. Editor, S. B. Williams, 330 West 42d St., N. Y. C. Managing Editor, S. B. Williams, 330 West 42d St., N. Y. C. Business Manager, Glenn Sutton, 330 West 42d St., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Electrical Trade Publishing Co., 330 West 42d St., N. Y. C. Howard Ehrlich, 330 West 42d St., N. Y. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is. (This information is required from daily publications only.)

GLENN SUTTON, Business Manager.
ELECTRICAL TRADE PUBLISHING CO.

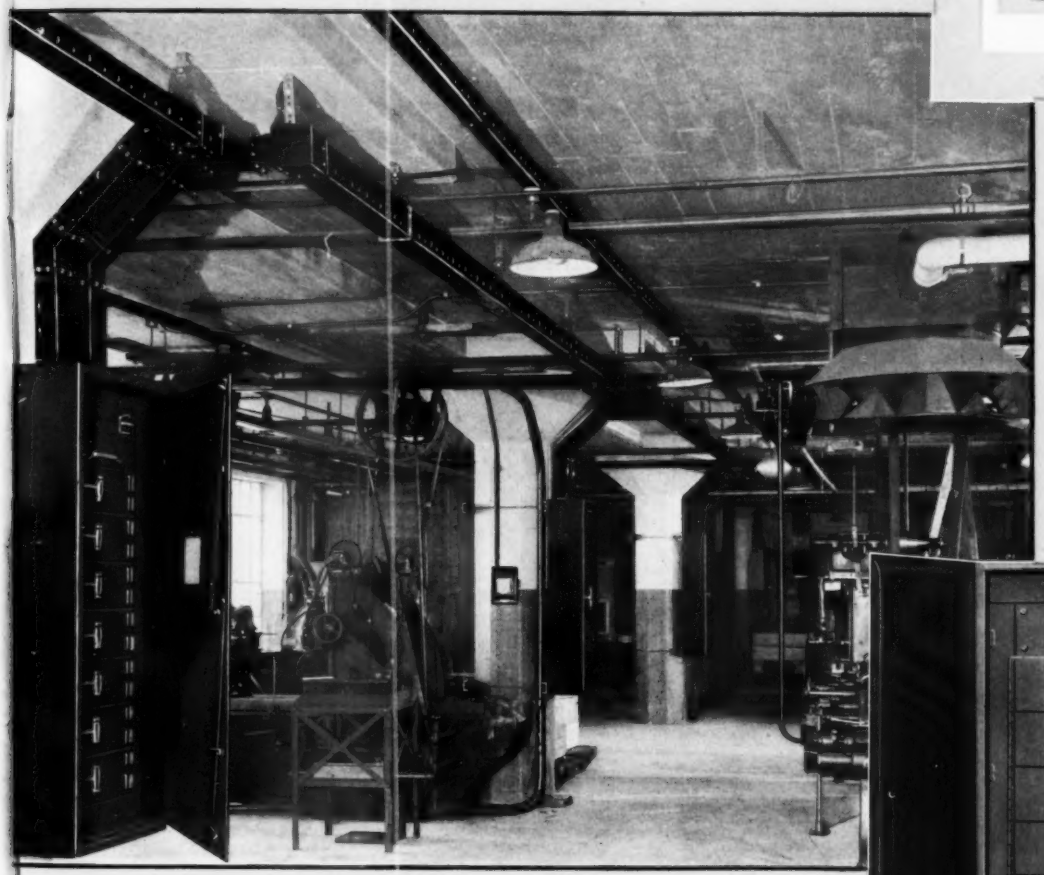
Sworn to and subscribed before me this 28th day of September, 1935.

[SEAL] H. E. BEIRNE,
Notary Public, Nassau County. Clk's No. 66. N. Y. Clk's No. 118. Reg. No. 6-B-73.
(My commission expires March 30, 1936)

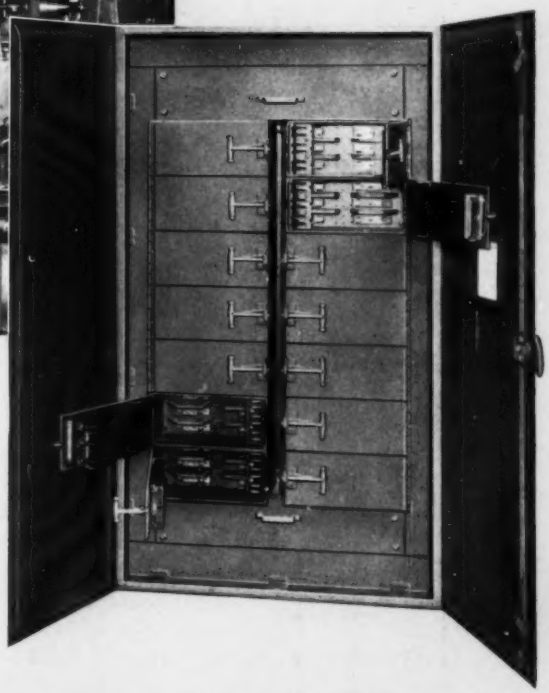
Advertisers' Index

Flexibility

...A CHARACTERISTIC OF SQUARE D POWER DISTRIBUTION EQUIPMENT



Square D Saflex Panels are excellent in design and appearance. They are designed for both power and light distribution.



■ The industrial plant equipped with SQUARE-Duct and Saflex Panelboards has no problem when changing production schedules requires a relocation of machines.

Saflex Panelboard units are interchangeable—in fact, the units themselves are convertible to different fuse spacings within limits. For instance, a 30-ampere unit can be quickly changed to accommodate 100-ampere fuses in 250-volt ratings; 200-ampere units can be changed to 100-ampere, and so on.

And with SQUARE-Duct—the rigid suspension method for wiring, used in conjunction with Saflex Panelboards—the changing of circuits is doubly easy. Knockouts every three inches along the entire system makes it possible to feed machines through short runs of conduit, without waste or salvage. SQUARE-Duct is available in one, two and five-foot lengths with standard fittings to meet every kind of building or electrical requirement.

If you are not acquainted with SQUARE-Duct and Saflex Panelboards you owe it to your industrial customers to investigate. Bulletins CA-505 and CA-502a will give you complete information and they are yours for the asking. We will gladly send copies to your customers, too, if you will give us their names.

SQUARE D COMPANY

DETROIT MICHIGAN U.S.A. MILWAUKEE WISCONSIN

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